Eaton® BladeUPS®

User's Guide
(Preassembled and Standard Systems)

For use with Eaton BladeUPS 5 kVA to 60 kVA (N+1) systems

Powering Business Worldwide

Class A EMC Statements

FCC Part 15

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

ICES-003

This Class A Interference Causing Equipment meets all requirements of the Canadian Interference Causing Equipment Regulations ICES-003.

Cet appareil numérique de la classe A respecte toutes les exigences du Reglement sur le matériel brouilleur du Canada.

EN 62040-2

Some configurations are classified under EN 62040-2 as "Class-A UPS for Unrestricted Sales Distribution." For these configurations, the following applies:

⚠ WARNING

This is a Class A-UPS Product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take additional measures.

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Requesting a Declaration of Conformity

Units that are labeled with a CE mark comply with the following harmonized standards and EU directives:

- Harmonized Standards: IEC 61000-3-12
- EU Directives:

  73/23/EEC, Council Directive on equipment designed for use within certain voltage limits

  93/68/EEC, Amending Directive 73/23/EEC

  89/336/EEC, Council Directive relating to electromagnetic compatibility

  92/31/EEC, Amending Directive 89/336/EEC relating to EMC

The EC Declaration of Conformity is available upon request for products with a CE mark. For copies of the EC Declaration of Conformity, contact:

Eaton Power Quality Oy
Koskelontie 13
FIN-02920 Espoo
Finland
Phone: +358-9-452 661
Fax: +358-9-452 665 68\

Special Symbols

The following are examples of symbols used on the UPS or accessories to alert you to important information:

RISK OF ELECTRIC SHOCK - Observe the warning associated with the risk of electric shock symbol.

CAUTION: REFER TO OPERATOR'S MANUAL - Refer to your operator's manual for additional information, such as important operating and maintenance instructions.

This symbol indicates that you should not discard the UPS or the UPS batteries in the trash. This product contains sealed, lead-acid batteries and must be disposed of properly. For more information, contact your local recycling/reuse or hazardous waste center.

This symbol indicates that you should not discard waste electrical or electronic equipment (WEEE) in the trash. For proper disposal, contact your local recycling/reuse or hazardous waste center.

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Chapter 1 Introduction

The Eaton® BladeUPS® is an uninterruptible power system (UPS) that protects your sensitive electronic equipment from the most common power problems, including power failures, power sags, power surges, brownouts, and line noise.

Power outages can occur when you least expect it, and power quality can be erratic. These power problems have the potential to corrupt critical data, destroy unsaved work sessions, and damage hardware—causing hours of lost productivity and expensive repairs.

With the BladeUPS, you can safely eliminate the effects of power disturbances and guard the integrity of your equipment. The BladeUPS is designed for critical applications such as ultra high-density blade servers in a data center environment. Figure 1 shows the BladeUPS with an optional Extended Battery Module (EBM).

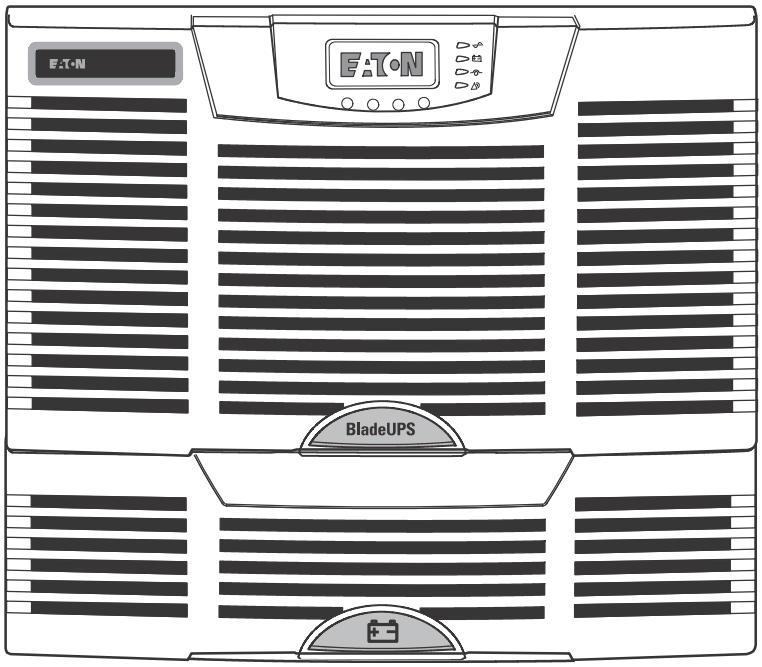


Figure 1. The BladeUPS Module with Optional EBM

Providing outstanding performance and reliability, unique BladeUPS benefits include the following:

- High-density three-phase input, three-phase output UPS.
- Scalability to 60 kW (redundant N+1 configuration) by connecting up to six additional BladeUPS modules. A standalone UPS converts to a parallel UPS by changing the line cord and adding a communication card. Each UPS in the parallel system connects to a BladeUPS Bar pre-installed in the rear of an Eaton rack. Racks can be configured for bottom or top entry.

  A Powerware Hot Sync® Controller Area Network (CAN) Bridge Card in each paralleled UPS provides connectivity for system metering and operational mode control. In a parallel system that is not fully loaded, each BladeUPS module will equally share the load. If the system loses input AC power, the system will shift load to the UPSs with the strongest batteries to maximize runtime when on battery. Parallel systems can be configured for capacity or redundancy and automatically increase redundancy as load levels decrease in 12 kW steps.
- 6U height that fits any standard 19-inch rack (see Figure 2).

- Normal operating mode that minimizes heat generation by operating typically at >98% efficiency. The UPS filters incoming AC power and provides consistent power to your equipment without draining the battery.
- For utility line input that exceeds normal operating range, automatic transfer to an online, double-conversion, high-frequency UPS design with pure sine wave output and power-factor correction.
- ABM® technology that uses advanced battery management to increase battery service life, optimize recharge time, and provide a warning before the end of useful battery life.
- Hot-swappable electronics module and batteries that simplify maintenance by allowing you to replace them safely without powering down the critical load.
- Emergency shutdown control through the remote emergency power-off (REPO) port.
- One standard communication option with a DB-9 serial port and two open communication bays (X-Slot) that allow a number of communication options.
- Firmware that is service upgradable through the DB-9 communication port.
- Backed by worldwide agency approvals.

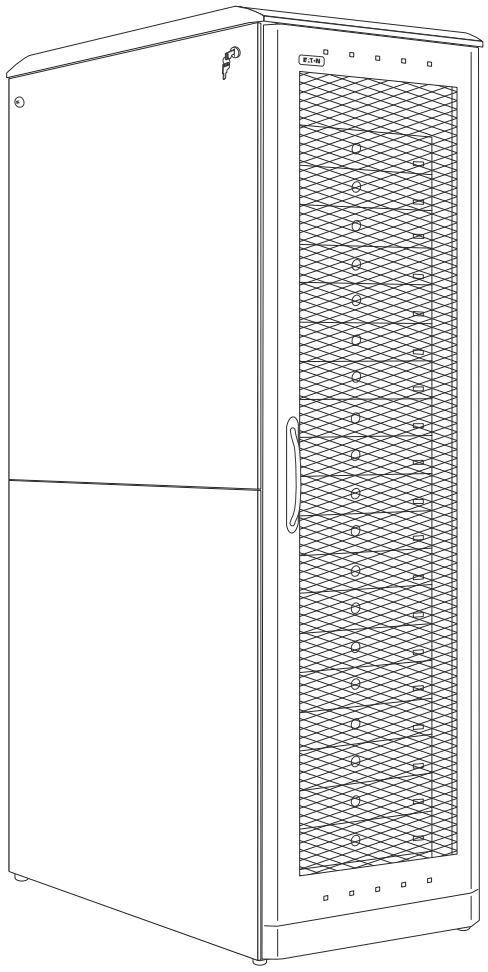


Figure 2. Standard Cabinet Used for BladeUPS

NOTE The illustrations in this document are typical, but may not be identical to your model.

The following accessories for the BladeUPS are available:

- Maintenance Bypass Module (MBM) to safely service the UPS without disrupting power.
- External Battery Interconnect to connect a customer-supplied external battery to the UPS for extended runtime.
- EBM for extended runtime.

NOTE Install up to four EBMs per UPS. Each EBM includes a 0.9m (3 ft) connector cable. A 0.9m (3 ft) battery extension cable is also available.

- X-Slot® cards with enhanced communication capabilities for network connectivity with monitoring and control.

The BladeUPS Bar for parallel systems, mounted in the rear of an Eaton rack, provides the required input and output connections for the paralleled UPSs and has system-rated input and output connections. Figure 3 shows an example of a BladeUPS parallel system.

The BladeUPS system can be installed with Eaton remote power panels, transformer cabinet with bypass and distribution, and rack-mounted power distribution systems.

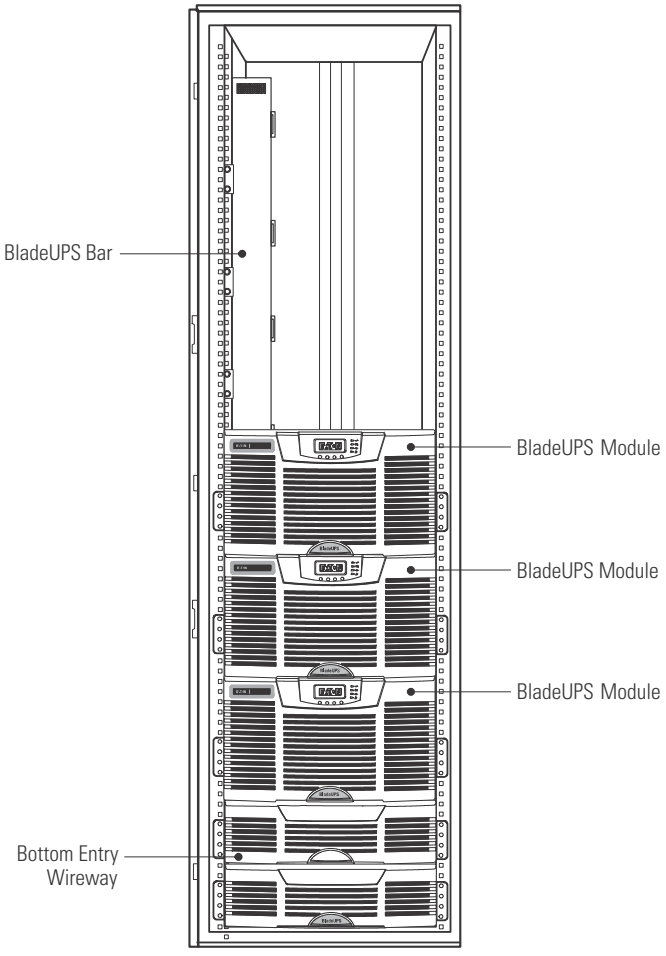


Figure 3. Example of a BladeUPS Parallel System

Note the following guidelines when configuring your BladeUPS standalone module or parallel system:

- The UPS accommodates a maximum of four EBMs.
- The EBM(s) for a standalone UPS can be mounted directly below the UPS or, with rack side panels removed, in an adjacent rack to the left or right of the rack containing the UPS.
- The EBMs for a parallel system can be mounted in an adjacent rack to the left or right of the rack containing the UPS (rack side panels removed).
- When configured with EBMs, each UPS in a parallel system must have the same number of EBMs installed.
- BladeUPS requires input phase rotation of A-B-C clockwise. Some load equipment may require phase rotation or phase relationship coordination to ensure proper operation. Review your equipment manufacturer's power requirement documents to ensure that your connected equipment operates correctly.

Chapter 2 Safety Warnings

IMPORTANT SAFETY INSTRUCTIONS — SAVE THESE INSTRUCTIONS

This manual contains important instructions that should be followed during installation and maintenance of the UPS and batteries. Read all instructions before operating the equipment and save this manual for future reference.

DANGER

This UPS contains **LETHAL VOLTAGES**. All repairs and service should be performed by **AUTHORIZED SERVICE PERSONNEL ONLY**. There are **NO USER SERVICEABLE PARTS** inside the UPS.

WARNING

- This UPS contains its own energy source (batteries). The UPS output may carry live voltage even when the UPS is not connected to an AC supply.
- To reduce the risk of fire or electric shock, install this UPS in a temperature and humidity controlled, indoor environment, free of conductive contaminants. Ambient temperature must not exceed 40°C (104°C). Do not operate near water or excessive humidity (95% maximum).
- To reduce the risk of fire, connect only to a circuit provided with branch circuit overcurrent protection in accordance with the National Electrical Code® (NEC®), ANSI/NFPA 70. See page 72 (standalone UPS) or page 75 (parallel system).
- Output overcurrent protection and disconnect switch must be provided by others.
- To comply with international standards and wiring regulations, the sum of the leakage current of the UPS and the total equipment connected to the output of this UPS must not have an earth leakage current greater than 3.5 milliamperes.

CAUTION

- Batteries can present a risk of electrical shock or burn from high short-circuit current. Observe proper precautions. Servicing should be performed by qualified service personnel knowledgeable of batteries and required precautions. Keep unauthorized personnel away from batteries.
- Proper disposal of batteries is required. Refer to your local codes for disposal requirements.
- Never dispose of batteries in a fire. Batteries may explode when exposed to flame.

Sikkerhedsanvisninger

VIGTIGE SIKKERHEDSANVISNINGER — GEM DISSE ANVISNINGER

Denne manual indeholder vigtige instruktioner, som skal følges under installation og vedligeholdelse af UPS'en og batterierne. Læs venligst alle instruktioner inden betjening af udstyret og gem denne manual mhp. fremtidige opslag.

FARE

Denne UPS indeholder LIVSFARLIG HØJSPÆNDING. Alle reparationer og vedligeholdelse bør kun udføres af en AUTORISERET SERVICETEKNIKER. Ingen af UPS'ens indvendige dele kan repareres af brugeren.

ADVARSEL!

- Denne UPS indeholder sin egen energikilde (batterier). Udgangsstikket på UPS'en kan endog være strømførende, når UPS'en ikke er koblet til en vekselstrømsforsyning.
- Installér denne UPS i et temperatur- og fugtighedskontrolleret indendørsmiljø, frit for ledende forureningsstoffer for at formindske risikoen for brand og elektrisk stød. Rumtemperaturen må ikke overstige 40°C. UPS'en bør ikke betjenes nær vand eller høj fugtighed (maksimalt 95%).
- For at reducere risikoen for brand må tilkobling kun ske til et kredsløb forsynet med 100 ampere maks. linieforgrenings overbelastningsbeskyttelse i overensstemmelse med National Electrical Code, ANSI/NFPA 70. Se efter side 70 eller side 46.
- Udgangsoverbelastningsbeskyttelsen og afbryderkontakten skal leveres af andre.
- I overensstemmelse med internationale normer og bestemmelser for el-installation må det udstyr, der er forbundet til udgangen af denne UPS, tilsammen ikke overskride en jordafdelingsspænding på mere end 3,5 milliampere.

ADVARSEL

- Batterierne kan give risiko for elektrisk stød eller brandsår forårsaget af høj kortslutningsstrøm. Overhold gældende forsigtighedsregler. Servicering skal udføres af kvalificeret servicepersonale med kendskab til batterier og gældende forsigtighedsregler. Hold uautoriseret personale væk fra batterierne.
- Korrekt bortskaffelse af batterier er påkrævet. Overhold gældende lokale regler for bortskaffelsesprocedurer.
- Skaf dig aldrig af med batterierne ved at brænde dem. Batterierne kan eksplodere ved åben ild.

Belangrijke Veiligheidsinstructies

BELANGRIJKE VEILIGHEIDSINSTRUCTIES — BEWAAR DEZE INSTRUCTIES

Deze handleiding bevat belangrijke instructies die u dient te volgen tijdens de installatie en het onderhoud van de UPS en de accu's. Lees alle instructies voordat u de apparatuur in bedrijf neemt en bewaar deze handleiding als naslagwerk.

GEVAAR

Deze UPS bevat LEVENSGEVAARLIJKE ELEKTRISCHE SPANNING. Alle reparaties en onderhoud dienen UITSLUITEND DOOR ERKEND SERVICEPERSONEEL te worden uitgevoerd. Er bevinden zich GEEN ONDERDELEN in de UPS die DOOR DE GEBRUIKER kunnen worden GEREPAREERD.

WAARSCHUWING

- Deze UPS bevat een eigen energiebron (accu's). De UPS-uitgang kan onder spanning staan, zelfs wanneer de UPS niet is aangesloten op de netspanning.
- Teneinde de kans op brand of elektrische schok te verminderen dient deze UPS in een gebouw met temperatuur? en vochtigheidregeling te worden geïnstalleerd, waar geen geleidende verontreinigingen aanwezig zijn. De omgevingstemperatuur mag 40°C niet overschrijden. Niet gebruiken in de buurt van water of bij zeer hoge vochtigheid (max. 95%).
- Sluit om brandgevaar te voorkomen de apparatuur uitsluitend aan op een circuit voorzien van een overstroombeveiliging voor vertakte circuits van maximaal 100 A in overeenstemming met de National Electrical Code (Nationale Elektriciteitsvoorschriften), ANSI/NFPA 70. Zien pagina 70 of pagina 46.
- De uitgangsoverstroombeveiliging en de stroomonderbreker moeten door derden worden geleverd.
- Om aan de internationale normen en bedradingsvoorschriften te voldoen mag de gehele apparatuur die op de uitgang van deze UPS is aangesloten, geen aardlekstroom van meer dan 3,5 milliampère hebben.

OPGELET

- Batterijen leveren gevaar op voor elektrische schokken en kunnen brandwonden veroorzaken door een grote kortsluitstroom. Neem de juiste voorzorgsmaatregelen in acht. Het onderhoud moet worden uitgevoerd door bevoegde onderhoudsmonteurs die verstand hebben van accu's en op de hoogte zijn van de vereiste voorzorgsmaatregelen. Houd onbevoegden uit de buurt van de accu's.
- De batterijen moeten op de juiste wijze worden opgeruimd. Raadpleeg hiervoor uw plaatselijke voorschriften.
- Nooit batterijen in het vuur gooien. De batterijen kunnen ontploffen.

Tarkeita Turvaohjeita

TÄRKEITÄ TURVAOHJEITA - SUOMI — SÄILYTÄ NÄMÄ OHJEET

Tämä käyttöohje sisältää tärkeitä ohjeita, joita on noudatettava UPS-virtalähteen ja akkujen asennuksen ja huollon yhteydessä. Lue kaikki ohjeet ennen laitteiston käyttöä ja säilytä ohje myöhempää tarvetta varten.

VAARA

Tämä UPS sisältää HENGENVAARALLISIA JÄNNITTEITÄ. Kaikki korjaukset ja huollot on jätettävä VAIN VALTUUTETUN HUOLTOHENKILÖN TOIMEKSI. UPS ei sisällä MITÄÄN KÄYTTÄJÄN HUOLLETTAVIA OSIA.

VAROITUS

- Tässä UPS-virtalähteessä on oma energianlähde (akut). UPS-virtalähteen lähdössä voi olla jännite, vaikka UPS-virtalähdettä ei ole kytketty verkkovirtaan.
- Vähentääksesi tulipalon ja sähköiskun vaaraa asenna tämä UPS sisätiloihin, joissa lämpötila ja kosteus on säädettävissä ja joissa ei ole virtaa johtavia epäpuhtauksia. Ympäristön lämpötila ei saa ylittää 40 °C. Älä käytä lähellä vettä ja vältä kosteita tiloja (95 % maksimi).
- Pienennä tulipalon vaaraa kytkemällä vain piiriin, jossa on 100 ampeerin maksimihaarapiirin ylivirtasuoja kansallisen sähkölainsäädännön (ANSI/NFPA 70) mukaan. Hiippakunta hotellipoika 70 eli hotellipoika 46.
- Muiden on toimitettava lähdön ylivirtasuoja ja irtikytkentäkytkin.
- Kansainväliset normit ja johdotusmääräykset vaativat, että kaikkien tämän UPS-laitteen ulostulokytkentöjen yhteinen maavuotovirta ei ylitä 3,5 milliampeeria (mA).

ADVARSEL

- Akut voivat aiheuttaa sähköiskun tai palovammojen vaaran johtuen suuresta oikosulkuvirrasta. Noudata kaikkia asianmukaisia varotoimia. Laitteen saa huoltaa vain ammattitaitoinen huoltohenkilökunta, joka tuntee akut ja niihin liittyvät varotoimet. Älä päästä valtuuttamatonta henkilöstöä lähelle akkuja.
- Akusto täytyy hävittää säädösten mukaisella tavalla. Noudata paikallisia määräyksiä.
- Älä koskaan heitä akkuja tuleen. Ne voivat räjähtää.

Consignes de sécurité

CONSIGNES DE SÉCURITÉ IMPORTANTES — CONSERVER CES INSTRUCTIONS

Ce manuel comporte des instructions importantes que vous êtes invité à suivre lors de toute procédure d'installation et de maintenance des batteries et de l'onduleur. Veuillez consulter entièrement ces instructions avant de faire fonctionner l'équipement et conserver ce manuel afin de pouvoir vous y reporter ultérieurement.

DANGER!

Cet onduleur contient des TENSIONS MORTELLES. Toute opération d'entretien et de réparation doit être EXCLUSIVEMENT CONFIÉE A UN PERSONNEL QUALIFIÉ AGRÉÉ. AUCUNE PIÈCE RÉPARABLE PAR L'UTILISATEUR ne se trouve dans l'onduleur.

AVERTISSEMENT!

- Cette onduleur possède sa propre source d'alimentation (batteries). Il est possible que la sortie de l'onduleur soit sous tension même lorsque l'onduleur n'est pas connectée à une alimentation CA.
- Pour réduire les risques d'incendie et de décharge électrique, installer l'onduleur uniquement à l'intérieur, dans un lieu dépourvu de matériaux conducteurs, où la température et l'humidité ambiantes sont contrôlées. La température ambiante ne doit pas dépasser 40 °C. Ne pas utiliser à proximité d'eau ou dans une atmosphère excessivement humide (95 % maximum).
- Afin de réduire les risques d'incendie, ne raccordez qu'à un circuit muni d'une protection de surintensité du circuit de dérivation maximum de 100 ampères conformément au Code Électrique National (National Electrical Code) des États-Unis, ANSI/NFPA 70. Voir page 70 ou page 46.
- La protection de surintensité de sortie ainsi que le sectionneur doivent être fournis par des tiers.
- Afin d'être conforme aux normes et règlements internationaux de câblage, le courant de fuite à la terre de la totalité du matériel branché sur la sortie de l'onduleur ne doit pas dépasser 3,5 mA.

ATTENTION!

- Les batteries peuvent présenter un risque de choc électrique ou de brûlure provenant d'un courant de court-circuit haute intensité. Observez les précautions appropriées. L'entretien doit être réalisé par du personnel qualifié connaissant bien les batteries et les précautions nécessaires. N'autorisez aucun personnel non qualifié à manipuler les batteries.
- Une mise au rebut réglementaire des batteries est obligatoire. Consulter les règlements en vigueur dans votre localité.
- Ne jamais jeter les batteries au feu. L'exposition aux flammes risque de les faire exploser.

Sicherheitswarnungen

WICHTIGE SICHERHEITSANWEISUNGEN — AUFBEWAREN

Dieses Handbuch enthält wichtige Anweisungen, die Sie während der Installation und Wartung des USV (Unterbrechungsfreies Stromversorgungssystem) und der Batterien befolgen müssen. Bitte lesen Sie alle Anweisungen des Handbuches bevor sie mit dem Gerät arbeiten. Bewaren Sie das Handbuch zum Nachlesen auf.

WARNUNG

Die USV führt lebensgefährliche Spannungen. Alle Reparatur- und Wartungsarbeiten sollten nur von Kundendienstfachleuten durchgeführt werden. Die USV enthält keine vom Benutzer zu wartenden Komponenten.

⚠ ACHTUNG

- Dieses USV (Unterbrechungsfreies Stromversorgungssystem) enthält eine eigene Energiequelle (Batterien). Der USV-Ausgang kann Spannung führen, auch wenn das USV nicht an eine Wechselstromquelle angeschlossen ist.
- Um die Brand? oder Elektroschockgefahr zu verringern, diese USV nur in Gebäuden mit kontrollierter Temperatur und Luftfeuchtigkeit installieren, in denen keine leitenden Schmutzstoffen vorhanden sind. Die Umgebungstemperatur darf 40°C nicht übersteigen. Die USV nicht in der Nähe von Wasser oder in extrem hoher Luftfeuchtigkeit (max. 95 %) betreiben.
- Um die Brandgefahr zu verringern, nur an eine Leitung anschließen, die mit einem Überlaststromschutz von maximal 100 Ampere in Übereinstimmung mit dem National Electrical Code, ANSI/NFPA 70 ausgestattet ist. Siehe Seite 70 oder Seite 46.
- Der Ausgangs-Überlaststromschutz und der Trennschalter müssen von anderen Herstellern geliefert werden.
- Um internationale Normen und Verdrahtungsvorschriften zu erfüllen, dürfen die an den Ausgang dieser USV angeschlossenen Geräte zusammen einen Erdableitstrom von insgesamt 3,5 Milliampere nicht überschreiten.

⚠ VORSICHT!

- Batterien können das Risiko eines elektrischen Schlags bergen oder durch hohen Kurzschlussstrom in Brand geraten. Die richtigen Vorsichtsmaßnahmen beachten. Die Wartung muss von qualifiziertem Wartungspersonal durchgeführt werden, das im Umgang mit Batterien geübt ist und über gute Kenntnisse der erforderlichen Vorsichtsmaßnahmen verfügt. Nicht autorisiertes Personal von Batterien fern halten.
- Die Batterien müssen ordnungsgemäß entsorgt werden. Hierbei sind die örtlichen Bestimmungen zu beachten.
- Batterien niemals verbrennen, da sie explodieren können.

Avvisi di sicurezza

IMPORTANTI ISTRUZIONI DI SICUREZZA — CONSERVARE QUESTE ISTRUZIONI

Il presente manuale contiene importanti istruzioni da seguire durante l'installazione e la manutenzione dell'UPS e delle batterie. Leggere integralmente le istruzioni prima di utilizzare l'apparecchiatura e conservare il presente manuale per futuro riferimento.

⚠ PERICOLO

La TENSIONE contenuta in questo gruppo statico di continuità è LETALE. Tutte le operazioni di riparazione e di manutenzione devono essere effettuate ESCLUSIVAMENTE DA PERSONALE TECNICO AUTORIZZATO. All'interno del gruppo statico di continuità NON vi sono PARTI RIPARABILI DALL'UTENTE.

AVVERTENZA

- L'UPS contiene la propria fonte di energia (batterie). Le prese d'uscita dell'UPS possono essere sotto tensione anche quando l'UPS non è collegato all'alimentazione elettrica CA.
- Per ridurre il rischio di incendio o di scossa elettrica, installare il gruppo statico di continuità in un ambiente interno a temperatura ed umidità controllata, privo di agenti contaminanti conduttivi. La temperatura ambiente non deve superare i 40°C. Non utilizzare l'unità in prossimità di acqua o in presenza di umidità eccessiva (95% max).
- Per ridurre il rischio di incendio, effettuare il collegamento soltanto a un circuito dotato di una protezione da sovraccarico per il circuito derivato di max. 100 ampere come stabilito dalle norme statunitensi sugli impianti elettrici (National Electrical Code, ANSI/NFPA 70). Vedere pagina 70 o pagina 46.
- La protezione da sovraccarico per le uscite e l'interruttore di scollegamento devono essere forniti da altri produttori.
- Per conformità con gli standard internazionali e con le norme in merito al cablaggio, tutta l'apparecchiatura collegata con l'uscita del gruppo statico di continuità non deve avere una corrente di dispersione di terra superiore a 3,5 milliampere.

ATTENZIONE

- Le batterie possono comportare un rischio di scossa elettrica o di ustione in seguito a un'elevata corrente di corto circuito. Osservare le dovute precauzioni. L'assistenza deve essere eseguita da personale qualificato esperto di batterie e delle necessarie precauzioni. Tenere il personale non autorizzato lontano dalle batterie.
- Le batterie devono essere smaltite in modo corretto. Per i requisiti di smaltimento fare riferimento alle disposizioni locali.
- Non gettare mai le batterie nel fuoco poichè potrebbero esplodere se esposte alle fiamme.

Viktig Sikkerhetsinformasion

VIKTIGE SIKKERHETSINSTRUKSJONER — GJEM DISSE INSTRUKSJONENE

Denne håndboken inneholder viktige instruksjoner som du bør overholde ved montering og vedlikehold av UPS-enheten og batteriene. Les alle instruksjoner før utstyret tas i bruk, og gjem håndboken til fremtidig referanse.

FARLIG

Denne UPS'en inneholder LIVSFARLIGE SPENNINGER. All reparasjon og service må kun utføres av AUTORISERT SERVICEPERSONALE. BRUKERE KAN IKKE UTFØRE SERVICE PÅ NOEN AV DELENE i UPS'en.

FARLIG

- UPS-enheten inneholder sin egen energikilde (batterier). UPS-utgangen kan være strømførende selv når UPS-enheten ikke er koblet til et strømuttak.
- For å redusere fare for brann eller elektriske støt, bør denne UPS'en installeres i et innendørs miljø med kontrollert temperatur og luftfuktighet som er fritt for ledende, forurensende stoffer. Romtemperaturen må ikke overskride 40°C. Den må ikke brukes i nærheten av vann eller ved meget høy luftfuktighet (95% maks.).
- For å redusere brannfaren skal det bare kobles til et kretsløp med 100 A maksimum linjeforgrenings overbelastningsbeskyttelse i henhold til National Electrical Code, ANSI/ NFPA 70. Se side 70 eller side 46.
- Overbelastningsbeskyttelse for strømutgang og bryterkontakt skal leveres av andre.
- Alt utstyr som er forbundet med utgangen av denne UPS'en må ikke ha en sterkere total lekkasjestrøm enn 3,5 milliampere for å være i overensstemmelse med internasjonale standarder og forkablingsbestemmelser.

FORSIKTIG

- Batterier kan utgjøre en fare for elektrisk støt eller brannsår pga. høy kortsluttingsstrøm. Treff passende forholdsregler. Service bør utføres av kvalifisert servicepersonale med kjennskap til batterier og nødvendige forholdsregler. Hold uautorisert personale borte fra batteriene.
- Batterier må fjernes på korrekt måte. Se lokale forskrifter vedrørende krav om fjerning av batterier.
- Kast aldri batterier i flammer, da de kan eksplodere, hvis de utsettes for åpen ild.

Regulamentos de Segurança

INSTRUÇÕES DE SEGURANÇA IMPORTANTES — GUARDE ESTAS INSTRUÇÕES

Este manual contém instruções importantes que devem ser seguidas durante a instalação e manutenção do no-break e das baterias. Leia todas as instruções antes de operar o equipamento e guarde este manual para consultá-lo futuramente.

PERIGO

A UPS contém VOLTAGEM MORTAL. Todos os reparos e assistência técnica devem ser executados SOMENTE POR PESSOAL DA ASSISTÊNCIA TÉCNICA AUTORIZADO. Não há nenhuma PEÇA QUE POSSA SER REPARADA PELO USUÁRIO dentro da UPS.

⚠ ADVERTÊNCIA

- Este no-break possui sua própria fonte de energia (baterias). A saída do no-break pode estar energizada mesmo que este não esteja conectado a uma fonte de energia elétrica.
- Para reduzir o risco de incêndios ou choques elétricos, instale a UPS em ambiente interno com temperatura e umidade controladas e livres de contaminadores condutíveis. A temperatura ambiente não deve exceder 40°C. Não opere próximo a água ou em umidade excessiva (máx: 95%).
- Para reduzir o risco de incêndio, conecte somente ao circuito fornecido com a proteção máxima de 100 ampères contra a sobretensão do circuito derivado, de acordo com a norma ANSI/ NFPA 70 do National Electrical Code. Ver página 70 ou página 46.
- A proteção contra a sobretensão de saída e o disjuntor deve ser fornecida por terceiros.
- Para estar de acordo com os padrões internacionais e os regulamentos de fiação, o equipamento total conectado à saída desta UPS não deve ter uma corrente de fuga à terra maior que 3,5 miliampères.

⚠ CUIDADO

- As baterias podem oferecer risco de choque elétrico ou queimadura, ocasionados por alta tensão com possibilidade de curto-circuito. Tome as precauções adequadas. A manutenção deve ser realizada por pessoal qualificado, com conhecimento sobre baterias e ciente das precauções exigidas. Mantenha o pessoal não autorizado afastado das baterias.
- Siga as instruções apropriadas ao desfazer?se das baterias. Consulte os códigos do local para maiores informações sobre os regulamentos de descarte de produtos.
- Nunca jogue as baterias no fogo, porque há risco de explosão.

Предупреждения по мерам безопасности

ВАЖНЫЕ УКАЗАНИЯ ПО МЕРАМ БЕЗОПАСНОСТИ — СОХРАНИТЕ ЭТИ УКАЗАНИЯ

В данном руководстве содержатся важные инструкции по установке и обслуживанию источника бесперебойного питания (ИБП) и батарей. Перед работой с оборудованием прочтите все инструкции. Сохраните данное руководство для дальнейшего использования.

⚠ ОПАСНО

В данном ИБП имеются СМЕРТЕЛЬНО ОПАСНЫЕ НАПРЯЖЕНИЯ. Все работы по ремонту и обслуживанию должны выполняться ТОЛЬКО УПОЛНОМОЧЕННЫМ ОБСЛУЖИВАЮЩИМ ПЕРСОНАЛОМ. Внутри ИБП нет узлов, ОБСЛУЖИВАЕМЫХ ПОЛЬЗОВАТЕЛЕМ.

⚠ ПРЕДУПРЕЖДЕНИЕ

- В данном ИБП установлены собственные источники энергии (батареи). В ИБП может иметься напряжение даже в том случае, если он не подключен к сети переменного тока.
- Для снижения опасности пожара или поражения электрическим током устанавливайте ИБП в закрытом помещении с контролируемыми температурой и влажностью, в котором отсутствуют проводящие загрязняющие вещества. Температура окружающего воздуха не должна превышать 40°C. Не эксплуатируйте устройство около воды или в местах с повышенной влажностью (макс. 95%).
- Для того чтобы снизить риск возникновения пожара, при подключении используйте электрическую цепь, снабженную защитой от перегрузки параллельной цепи с максимальной силой тока 100 A (в соответствии с Национальными электротехническими правилами и нормами ANSI / NFPA 70). Видеть паж 70 или паж 46.
- Устройство защиты от перегрузки выходного напряжения и размыкающий переключатель приобретаются отдельно.
- Для обеспечения соблюдения требований международных стандартов и требований к разводке электрических цепей, суммарная величина тока утечки на землю всего оборудования, подключенного к выходу ИБП, не должна превышать 3,5 миллиампера.

⚠ ОСТОРОЖНО

- Высокое напряжение, вызванное коротким замыканием в батарее, может привести к поражению электрическим током или ожогу. Соблюдайте меры предосторожности. Техническое обслуживание должно осуществляться квалифицированным персоналом по работе с источниками питания, знакомым с мерами предосторожности. Не допускайте к работе с батареями посторонних.
- Необходимо соблюдать правила утилизации аккумуляторов. Обратитесь к местным нормативным актам за информацией о требованиях к утилизации.
- Никогда не бросайте аккумуляторы в огонь. Аккумуляторы могут взорваться под воздействием огня.

Advertencias de Seguridad

INSTRUCCIONES DE SEGURIDAD IMPORTANTES — GUARDE ESTAS INSTRUCCIONES

Este manual contiene instrucciones importantes que debe seguir durante la instalación y el mantenimiento del SIE y de las baterías. Por favor, lea todas las instrucciones antes de poner en funcionamiento el equipo y guarde este manual para referencia en el futuro.

⚠ PELIGRO

Este SIE contiene VOLTAJES MORTALES. Todas las reparaciones y el servicio técnico deben ser efectuados SOLAMENTE POR PERSONAL DE SERVICIO TÉCNICO AUTORIZADO. No hay NINGUNA PARTE QUE EL USUARIO PUEDA REPARAR dentro del SIE.

⚠ ADVERTENCIA

- Este SIE contiene su propia fuente de energía (baterías). La salida del SIE puede transportar voltaje activo aun cuando el SIE no esté conectado con una fuente de CA.
- Para reducir el riesgo de incendio o de choque eléctrico, instale este SIE en un lugar cubierto, con temperatura y humedad controladas, libre de contaminantes conductores. La temperatura ambiente no debe exceder los 40°C. No trabaje cerca del agua o con humedad excesiva (95% máximo).
- Para reducir el riesgo de incendio, realice la conexión únicamente hacia un circuito que cuente con un máximo de 100 amperios de protección contra sobrecorriente de circuito derivado, de acuerdo con el Código Eléctrico Nacional, ANSI/NFPA 70. Consulte la página 70 o la página 46.
- La protección contra sobrecorriente de salida y el conmutador de desconexión debe suministrarse por parte de terceros.
- Para cumplir con los estándares internacionales y las normas de instalación, la totalidad de los equipos conectados a la salida de este SIE no debe tener una intensidad de pérdida a tierra superior a los 3,5 miliamperios.

⚠ PRECAUCIÓN

- Las baterías pueden constituir un riesgo de descarga eléctrica o quemaduras por corriente alta de corto circuito. Adopte las precauciones debidas. Personal calificado de servicio que conozca de baterías y esté al tanto de las precauciones requeridas debe darle servicio al equipo. Mantenga al personal no autorizado alejado de las baterías.
- Es necesario desechar las baterías de un modo adecuado. Consulte las normas locales para conocer los requisitos pertinentes.
- Nunca deseche las baterías en el fuego. Las baterías pueden explotar si se las expone a la llama.

Säkerhetsföreskrifter

VIKTIGA SÄKERHETSFÖRESKRIFTER — SPARA DESSA FÖRESKRIFTER

Den här anvisningen innehåller viktiga instruktioner som du ska följa under installation och underhåll av UPS-enheten och batterierna. Läs alla instruktioner innan du använder utrustningen och spara den här anvisningen för framtida referens.

⚠ FARA

Denna UPS-enhet innehåller LIVSFARLIG SPÄNNING. ENDAST AUKTORISERAD SERVICEPERSONAL får utföra reparationer eller service. Det finns inga delar som ANVÄNDAREN KAN UTFÖRA SERVICE PÅ inuti UPS-enheten.

VARNING

- Den här UPS-enheten innehåller sin egen energikälla (batterier). UPS-enhetens uttag kan vara spänningsförande även då UPS-enheten inte är ansluten till spänningsnätet.
- Minska risken för brand eller elektriska stötar genom att installera denna UPS-enhet inomhus, där temperatur och luftfuktighet är kontrollerade och där inga ledande föroreningar förekommer. Omgivande temperatur får ej överstiga 40°C. Använd inte utrustningen nära vatten eller vid hög luftfuktighet (max 95 %).
- För att reducera faran för brand får anslutning endast utföras till en krets som skyddas med överbelastningsskydd på maximalt 100 ampere i enlighet med National Electrical Code, ANSI/NFPA 70. Se sida 70 eller sida 46.
- Utgående överbelastningssydd och kretsbrytare måste levereras av annan leverantör.
- För att överensstämma med internationell standard och installationsföreskrifter får inte den totala utrustning som anslutits till uttagen på denna UPS-enhet ha läcksström som överstiger 3,5 milliampere.

VITKTIGT

- Batterierna kan innebära en risk för elektrisk stöt eller brännskada från kortsluten starkström. Iakttag lämpliga försiktighetsåtgärder. Service ska utföras av utbildad servicepersonal med kunskap om batterierna och nödvändiga försiktighetsåtgärder. Håll ej behörig personal borta från batterierna.
- Batterierna måste avyttras enligt anvisningarna i lokal lagstiftning.
- Använda batterier får aldrig brännas upp. De kan explodera.

Chapter 3 Preassembled System Installation

The preassembled system comes with the BladeUPS Bar, wireway, and BladeUPS modules already installed. For configurations with five and six UPS systems, some batteries are shipped uninstalled for better weight distribution.

This chapter explains:

- Equipment inspection
- Floor loading specifications
- Moving and unloading the system
- Preassembled system setup
- Installing the input and output wiring
- Installing UPS internal batteries
- Extended Battery Module (EBM) setup and installation (optional)
- Initial startup

NOTE For instructions on how to install the optional Maintenance Bypass Module (MBM), refer to the user's guide for the MBM.

Inspecting the Equipment

If any equipment has been damaged during shipment, keep the shipping cartons and packing materials for the carrier or place of purchase, and file a claim for shipping damage. If you discover damage after acceptance, file a claim for concealed damage.

To file a claim for shipping damage or concealed damage: 1) File with the carrier within 15 days of receipt of the equipment; 2) Send a copy of the damage claim within 15 days to your service representative.

Tools Required

To assemble the components, you may need the following tools:

- Medium flat-bladed screwdriver
- Short- and long-handled #2 Phillips® screwdriver
- 6-inch extension bar (or longer)
- Ratcheting socket wrench and socket for 3/8- inch and 10/24-sized screws
- 7 mm, 8 mm wrench or socket
- Adjustable Crescent wrench
- Utility knife
- Adjustable pliers
- Forklift or pallet jack
- Step ladder

NOTE Use safety best practices when standing on a ladder.

NOTE You may find it useful to use a magnetized screwdriver when removing or replacing mounting screws.

Floor Loading

When planning the installation, consider the system weight for floor loading. The strength of the installation surface must be adequate for point and distributed loadings. Approximate weights are shown in Table 1.

Table 1. Weights

Number of UPSs	Shipping Weight (Pallet, Rack, Wireway, BladeUPS Bar, and UPSs)	System Weight (Excludes Pallet)
1	471.7 kg (1040 lb)	304.8 kg (672 lb)
2	617.8 kg (1362 lb)	450.9 kg (994 lb)
3	763.9 kg (1684 lb)	596.9 kg (1316 lb)
4	909.9 kg (2006 lb)	743.0 kg (1638 lb)
5	1060.5 kg (2328 lb)	889.0 kg (1960 lb)
6	1202.0 kg (2650 lb)	1035.1 kg (2282 lb)

Moving the System and Battery Pallets

The system is bolted to a wooden pallet supported by wood skids. The batteries are stacked on a separate pallet and are held in place with strap binding.

To move the system:

1. Verify that the forklift or pallet jack is rated to handle the weight of the system (see Table 1 for system weight).
2. If not already moved, use a forklift or pallet jack to move the system to the installation area, or as close as possible. Insert the forklift jacks between the skids at the front of the pallet.

WARNING

The forklift jacks must be inserted between the skids at the front of the pallet (see Figure 4). If unloading instructions are not closely followed, moving the system may cause serious injury.

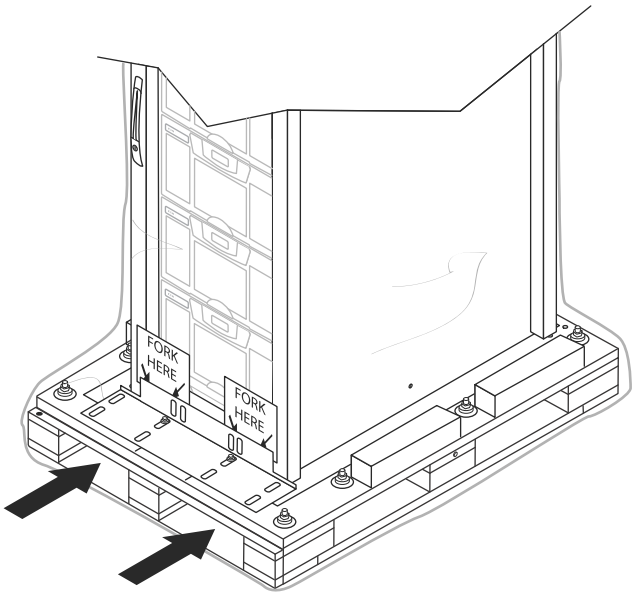


Figure 4. Inserting the Forklift Jacks

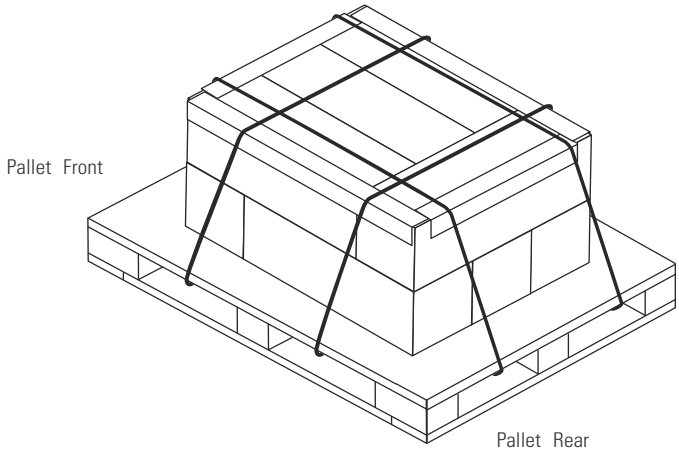
3. **Five and six UPS systems only.** Locate the battery cartons on the separate pallet (see Figure 5).
4. If the battery pallet is not already moved, verify that the forklift or pallet jack you will use is rated to handle the weight of the batteries and the pallet (see Table 1 on page 18 for battery weight).
5. Insert the forks of the forklift or pallet jack between the skids on either side of the pallet to move it.

WARNING

The forklift jacks must be inserted between the skids of the pallet (see Figure 4). If unloading instructions are not closely followed, moving the batteries may cause serious injury.

6. Use a forklift or pallet jack to move the battery pallet close to the installation area.

NOTE Do not park the pallet in a location that will interfere with installing the system.



Note: Battery cartons for five and six UPS systems only.

Figure 5. Moving the Battery Pallet

NOTE You will install the batteries in the top two UPS cabinets after the system is installed in the final location (described in "Installing the UPS Internal Batteries" on page 30).

7. Continue to the"Installing the Ramp" section.

Installing the Ramp

To install the ramp:

1. Remove the outer plastic wrap and the four protective cardboard corners from the system.
2. Discard or recycle the packaging in a responsible manner, or store it for future use.
3. Locate the ramp on the back of the cabinet. Hold the ramp in place while you cut the strap that binds it to the system (see Figure 6).

⚠ CAUTION

If not held in place when the strap is cut, the ramp can fall and cause injury.

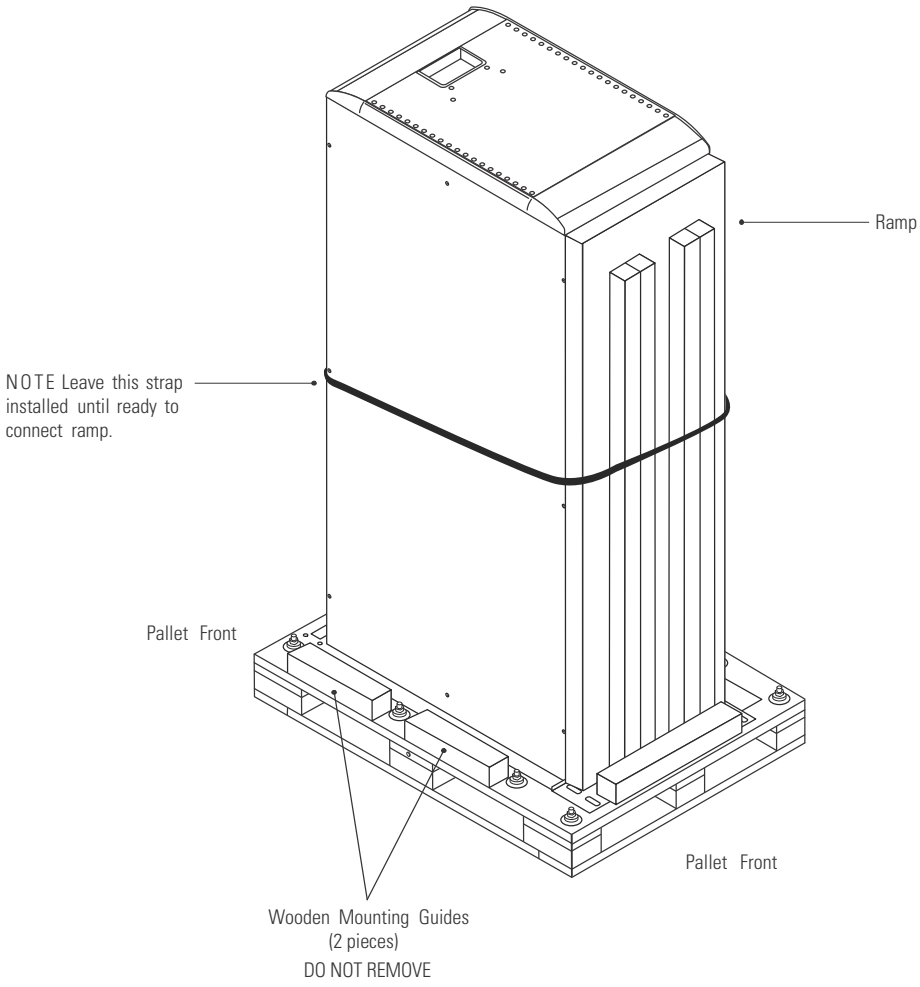


Figure 6. Removing the Ramp

4. Lift the ramp from the back of the cabinet. Attach it to the pallet by inserting the left and right ramp pins (tee nuts) into the pre-drilled holes at the rear of the pallet (see Figure 7).
5. Continue to the"Unloading the System" section.

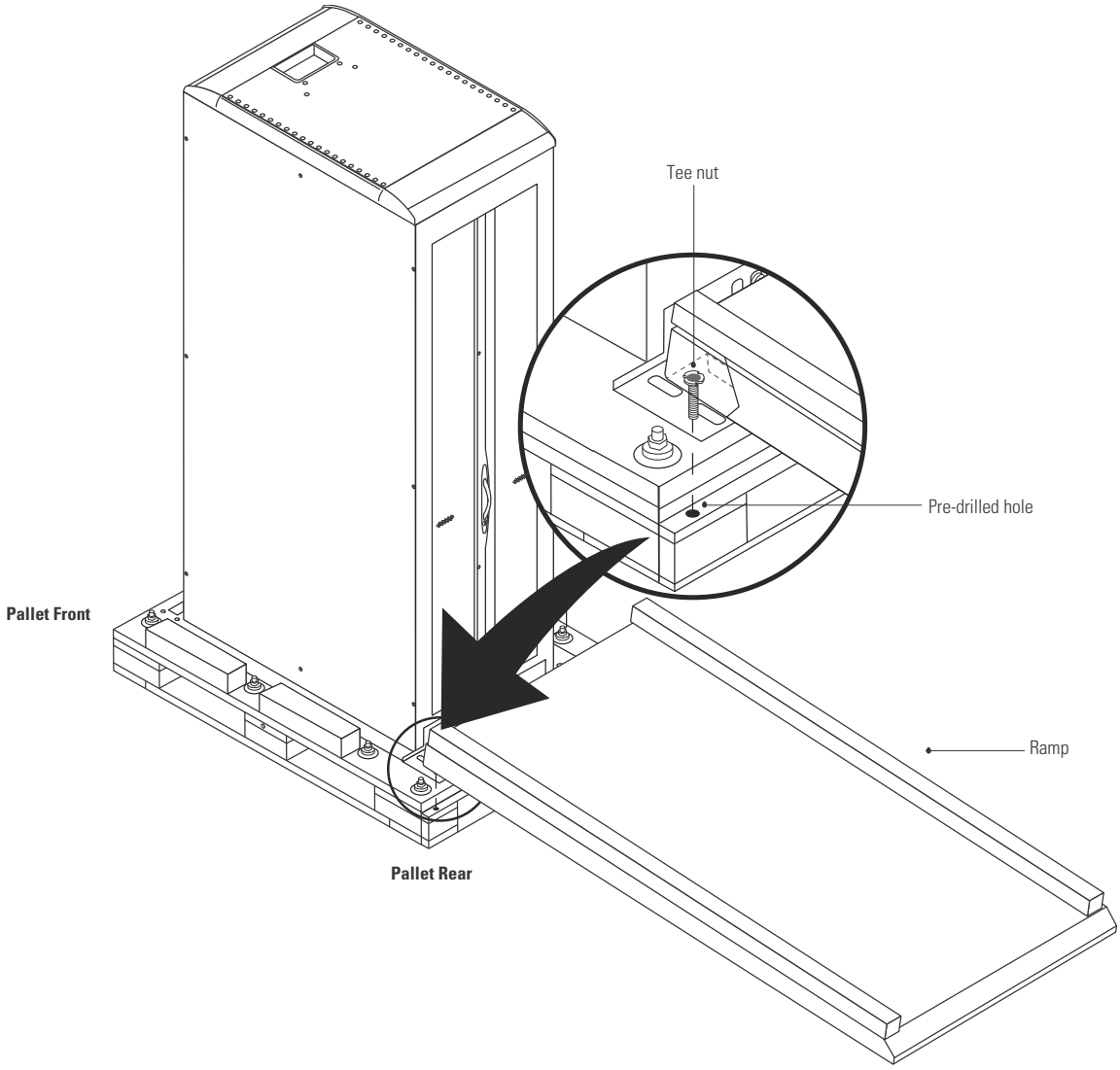


Figure 7. Attaching the Ramp to the Pallet

Unloading the System

CAUTION

The system is heavy. See Table 1 on page 18 for system weight. If unloading instructions are not closely followed, the system can cause serious injury.

CAUTION

Do not tilt system more than 10° sideways from vertical.To unload the system:

NOTE There is a front and a rear stabilizing bracket to secure the system for shipping. The brackets are bolted both to the pallet and the cabinet. The bolts must be removed before unloading the system.

1. Remove the four shipping bolts securing the front stabilizing bracket (see Figure 8).
2. Remove the four shipping bolts securing the rear stabilizing bracket.
3. Remove the brackets.

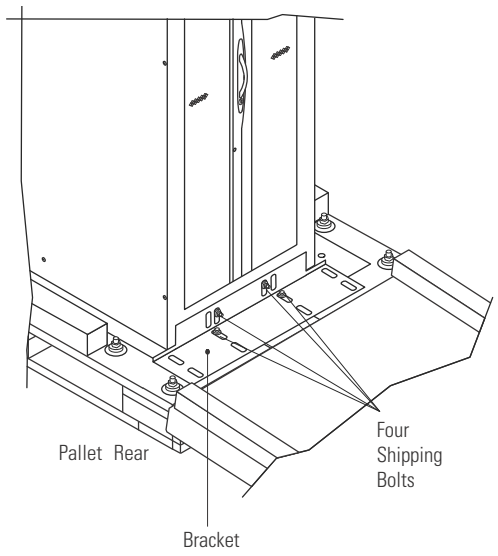


Figure 8. Removing the Stabilizing Brackets

4. If the leveling feet are not fully retracted, turn the leveling feet clockwise until they are retracted (see Figure 9).

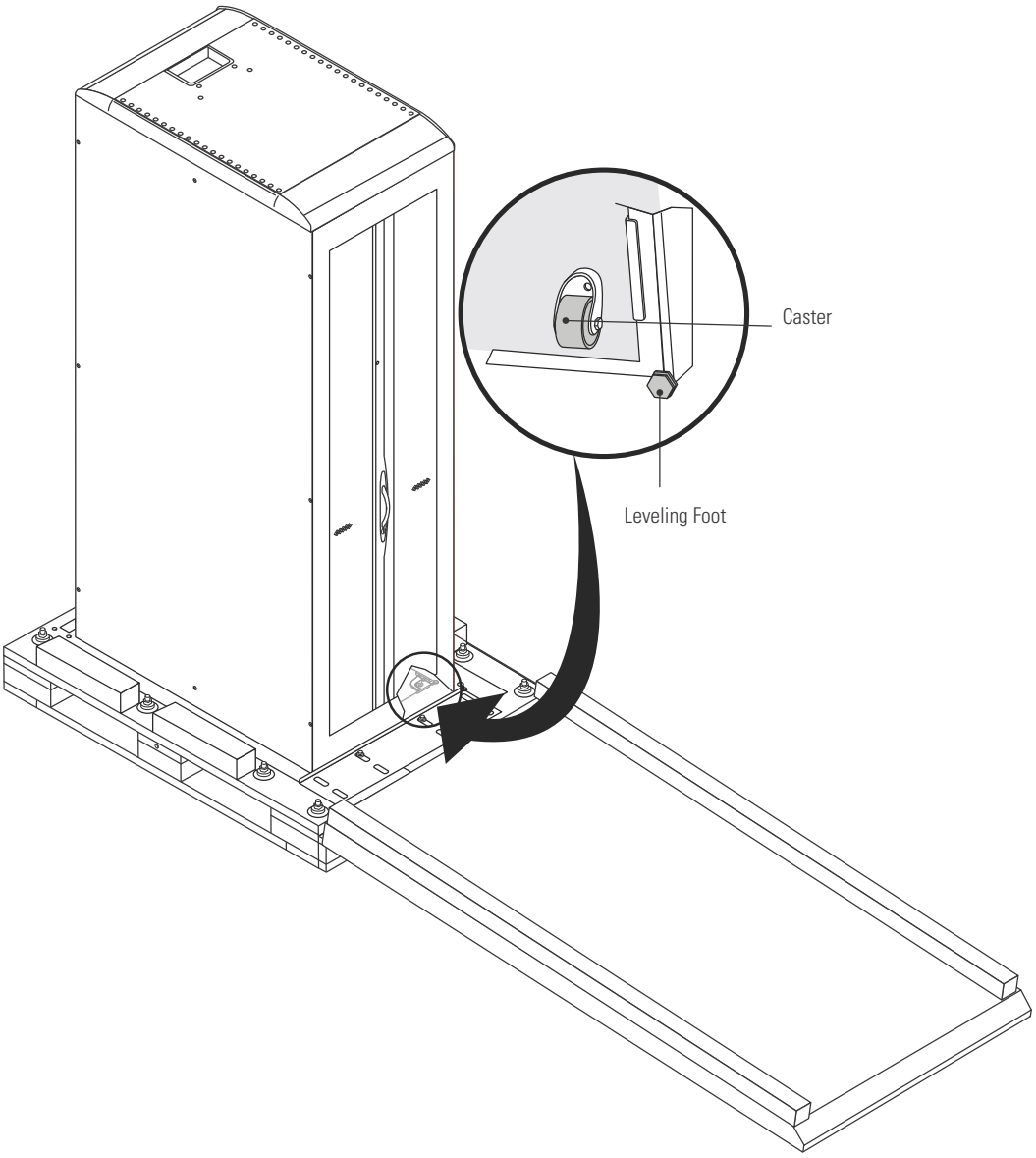


Figure 9. Locating the Leveling Feet

CAUTION

The system is heavy. See Table 1 on page 18 for system weights.

CAUTION

To prevent possible injury, do not stand in the path of the system when unloading the system from the pallet. Unloading the system requires three people: one behind the system and one on each side. If unloading instructions are not closely followed, the system can cause serious injury.

NOTE For five and six UPS systems, batteries are shipped on a separate pallet. The batteries are installed in the UPS module after the system is moved to the final installation location. The weights for five and six UPS systems as they are rolled off the pallet are:

- Five UPS system: 803.8 kg (1772 lb)
- Six UPS system: 864.6. kg (1906 lb)

5. Slowly roll the system toward the rear of the pallet. With the system supported on each side, continue rolling the system down the center of the ramp until the system is clear of the pallet. See Figure 10.

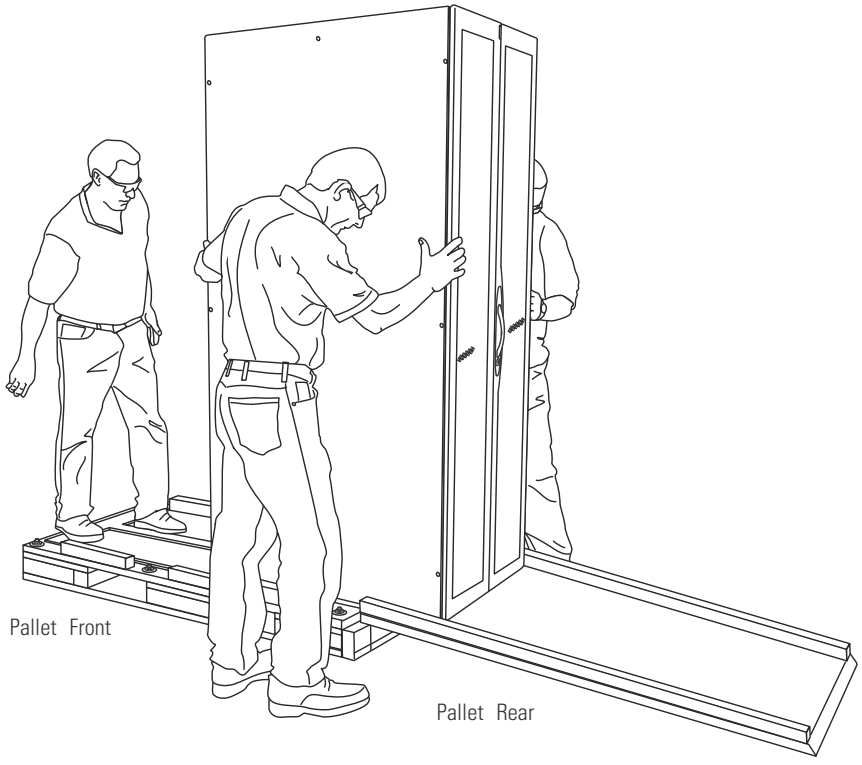


Figure 10. Unloading the System

6. Roll the system to the final installation location.
7. Continue to the "Preassembled System Setup" section.

Preassembled System Setup

CAUTION

Only qualified service personnel (such as a licensed electrician) shall perform the electrical installation. Risk of electrical shock.

NOTE The BladeUPS is a transformerless UPS that requires an unbroken neutral from the AC source. Installations with an upstream generator or dual source ATS that will open the neutral (4 pole) will require either an isolation transformer in front of the UPS, or a 50 mS overlap of the different source neutrals during the transition. For more information, talk with your Eaton UPS sales specialist.

UPSs in a parallel configuration require a dedicated branch circuit that meets the following requirements:

- Three-phase, 4-wire plus ground, 208Y/120V nominal (BladeUPS 12 model) or 400Y/230V nominal, 380–415 Vac acceptable (BladeUPS 12i model)
- 50/60 Hz
- Wall-mounted breaker that is readily accessible to the operator
- Flexible or rigid metal conduit
- Circuit with overcurrent protection, depending on parallel configuration (see Table 2)

Table 2. BladeUPS Overcurrent Protection

Number of UPSs in Preassembled System	BladeUPS 12 Model	BladeUPS 12i Model
1	50A	30A
2	100A	63A
3	150A	75A
4	200A	100A
5	225A	125A
6 (N+1 System)	225A	160A

NOTE For ease of wiring access with bottom entry, place the rack containing the UPSs on a raised floor.

Preparing the Rack

To prepare the rack for wiring:

1. Remove the accessory box that is located in the rear of the system behind the rack doors.
2. Verify that the following items are in the accessory box:
   - UPS documentation and software tools:
     - Software Suite CD and this user's guide
     - BladeUPS: Documents, Firmware, and Installation Video CD
   - (2) door keys
   - CAN Bridge Card accessories:
     - (1) CAN Bridge Card cable
     - (1) Redundant Signal cable
   - Optional X-Slot card accessories

The preassembled system can be ordered with any of the optional X-Slot cards installed. Accessories for installed cards are in the accessory box. Table 3 lists the cards and the associated accessories.

Table 3. Optional X-Slot Card Accessories

Optional Card	Documentation	Other Accessories
ConnectUPS®-X Web/SNMP Card	User's guide	Serial cable Ethernet cable
Relay Interface Card	—	Small mounting plate (2) screws
Modbus® Card	User's guide	Serial cable
Industrial Relay Card	User's guide	Metal plate (2) screws
Power Xpert® Gateway Series PXGX-UPS Card	User's guide Reminder card	Serial cable Ethernet cable

3. Verify that the supplied keys lock and unlock the door.
4. **Optional.** You may flip the rack door to allow it to open from the opposite side. To flip the door:
   a. Remove the hinge pins, then remove the door. Move the hinges to the opposite side of the rack.
   b. Reorient the door and hang it on the hinges; replace the hinge pins.
   c. Move the Eaton logo to the upper part of the door.
5. Verify that the leveling feet are long enough to lower to the floor.
6. To install the input and output wiring, go to one of the following sections:

- For top entry installation, see "Top Entry Installation" on page 28.
- For bottom entry installation, see "Bottom Entry Installation" on page 36.

Top Entry Installation

Figure 11 shows input and output wiring in a top entry system.

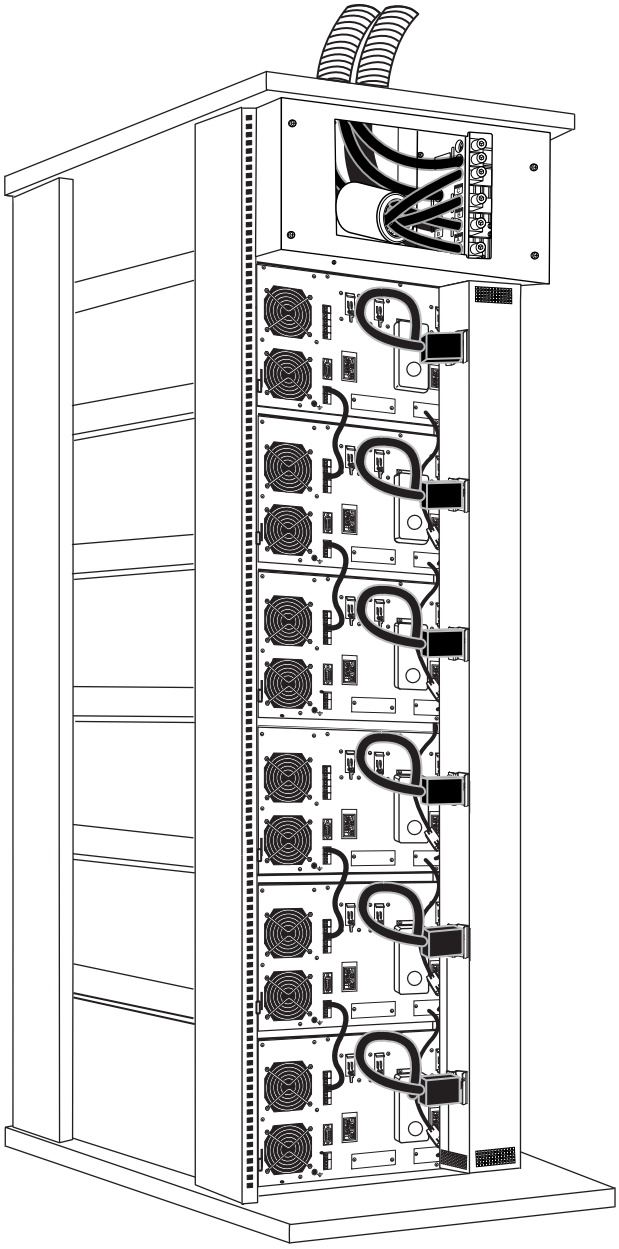


Figure 11. Top Entry Wiring Installation

To install the parallel system input and output wiring:

1. Verify that all battery circuit breakers on all UPSs are in the OFF (O) position (see Figure 12).

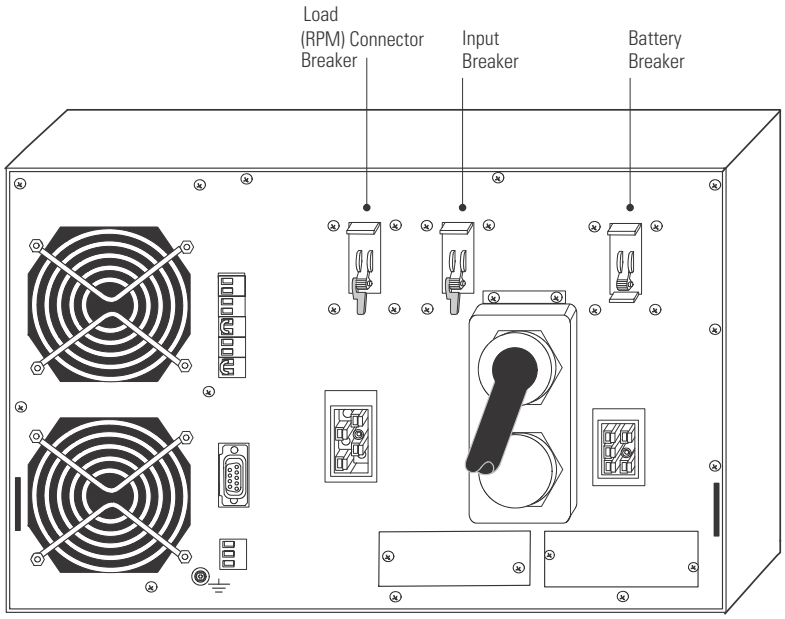


Figure 12. BladeUPS Module Rear Panel

2. To remove the upper side panels from the cabinet (see Figure 13):
   - At the top of the cabinet, unlock the upper side panels with the key.
   - Remove the left and right upper side panels and set them aside.
   - Secure the key so it will be available when you are ready to replace the upper side panels.

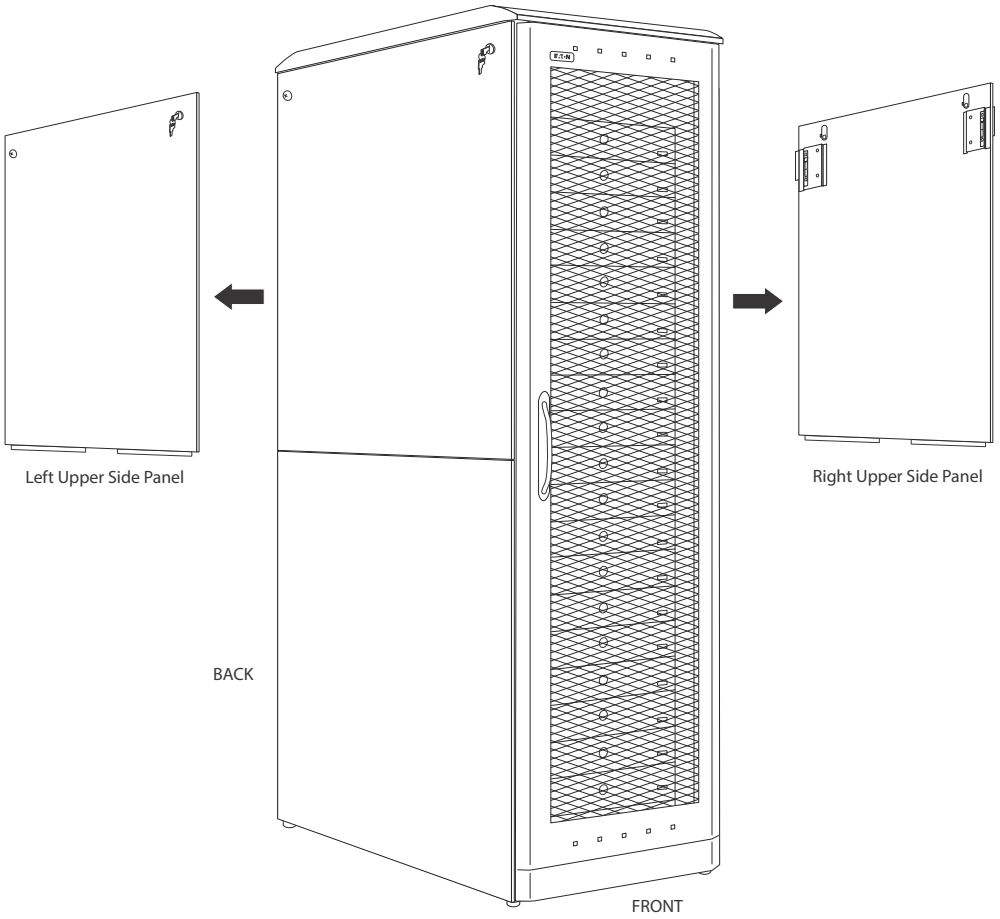


Figure 13. Removing the Upper Side Panels

3. Use a magnetized Phillips screwdriver to remove the trim on each side of the cabinet top panel (see Figure 14):
   - Remove and retain the four interior trim screws located on the inside of the side panel (A, B, C, and D).
   - Remove and retain the four pairs of outside trim screws located at the top on each rack (1 through 8).
   - Remove and retain the top trim panels.
   - Place both top trim panels and all mounting screws together in the same accessible location.

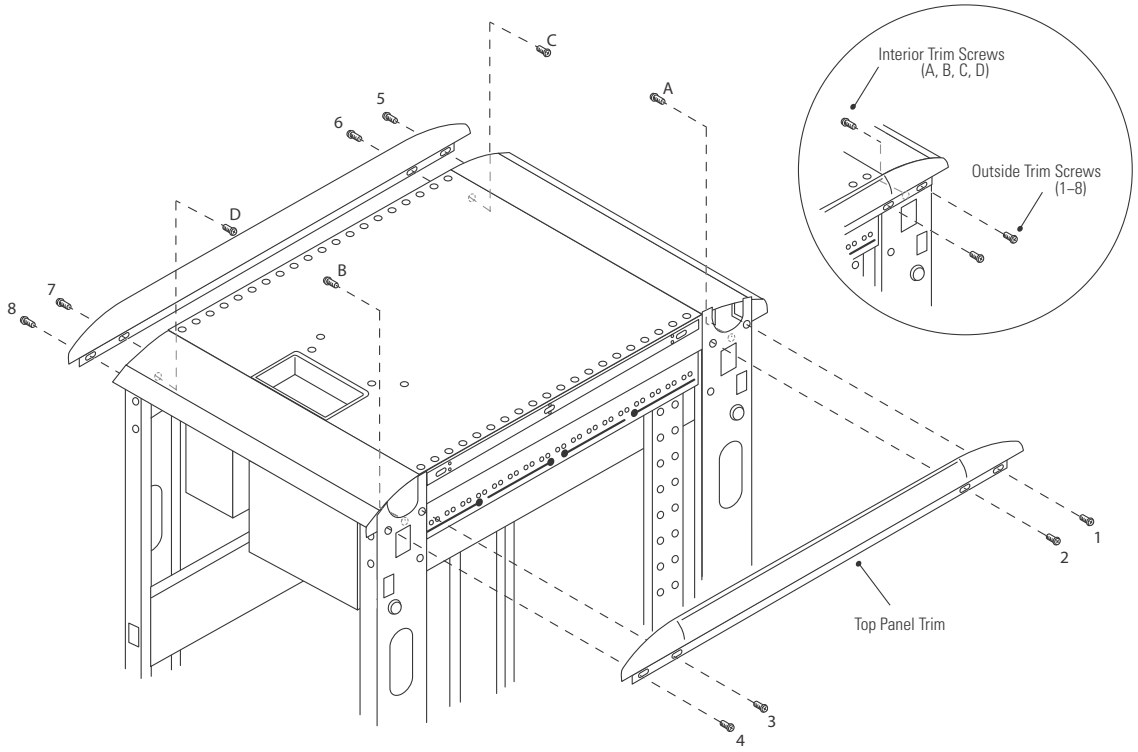


Figure 14. Removing the Trim Screws

NOTE Each top panel trim has three pieces, but do not disassemble it. It is attached as one assembly.

4. Use a ratcheting socket wrench with a 3/8-inch socket or a screwdriver to loosen the bolts that secure the cabinet top panel (see Figure 15):
   - Locate the five top panel bolts inside the rack. Three bolts are located at the front of the rack and two bolts are at the back of the rack.
   - Loosen the bolts, but do not remove them. Leave them protruding about 1/8 inch.

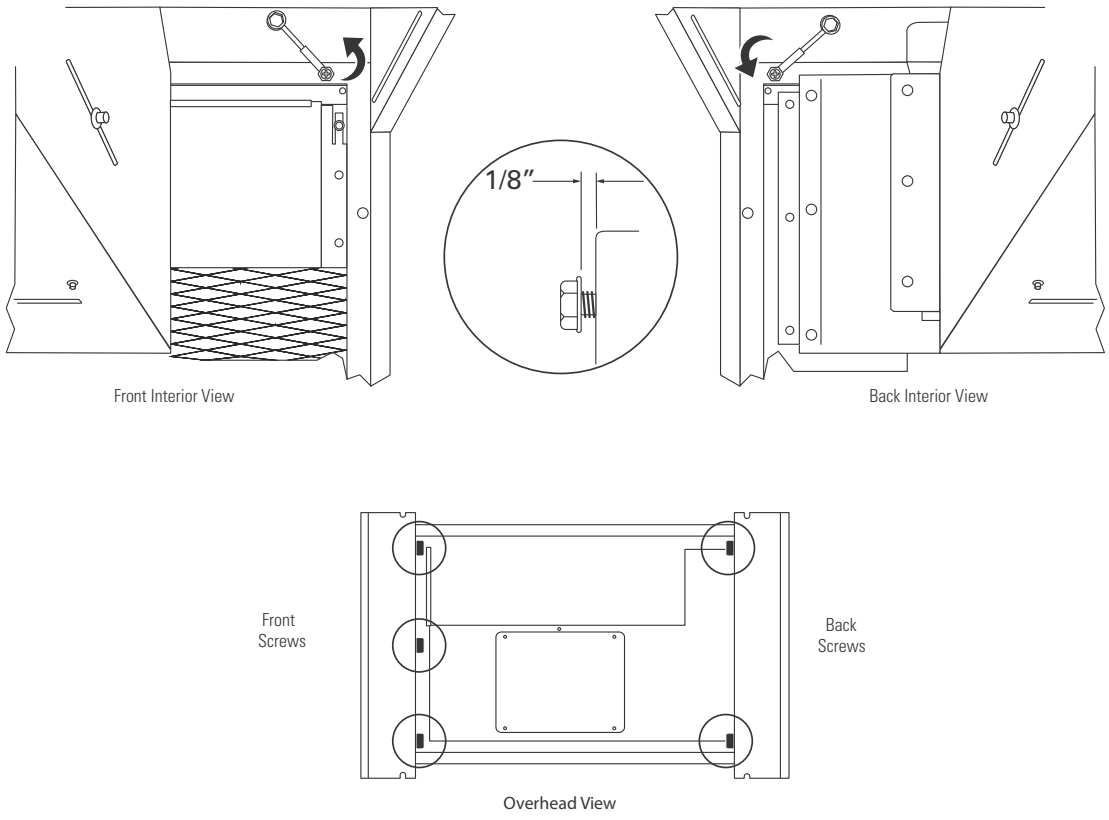


Figure 15. Removing the Cabinet Top Panel Screws

NOTE Use an extension bar on the socket wrench or screwdriver if you need to reach the screws. You may also need to use a step ladder. Use safety best practices when standing on a ladder.

5. With the back doors open, reach up inside the rack and push up the cabinet top panel to lift it off of the loosened bolts. Retain the panel (see Figure 16).

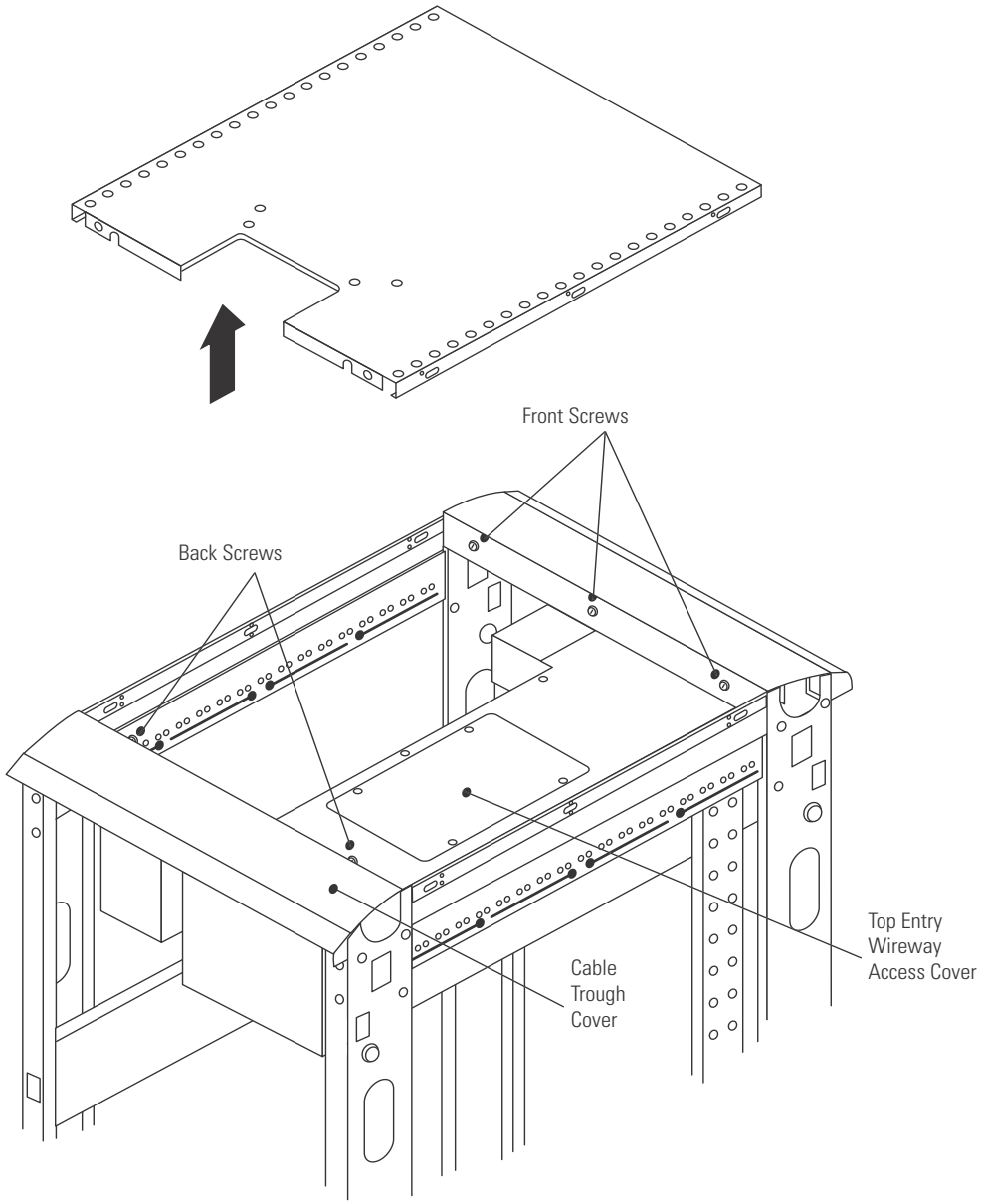


Figure 16. Removing the Top Panel

6. Remove the six screws on the conduit landing plate and retain. Remove and retain the plate (see Figure 17).

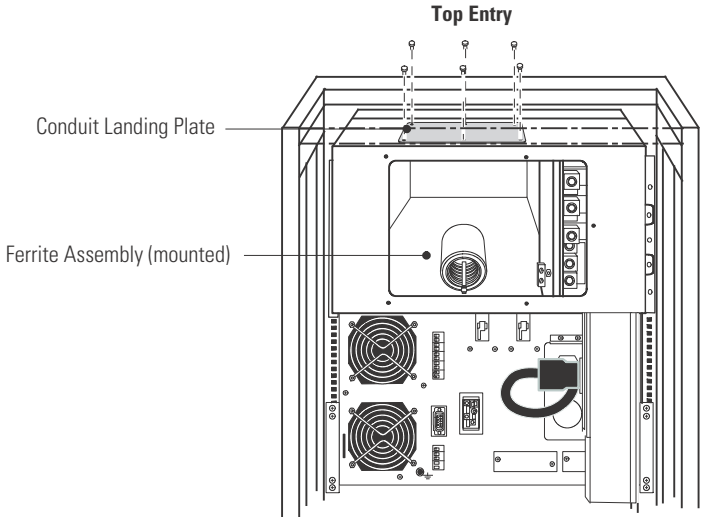
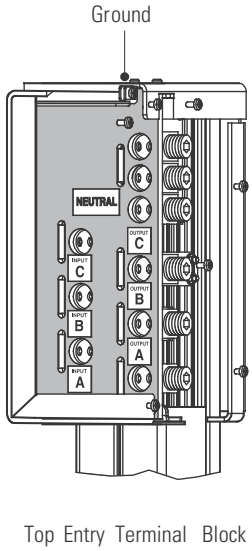


Figure 17. Removing the Top Entry Conduit Landing Plate

7. Use a Greenlee® punch to provide one or more holes in the conduit landing plate to accommodate the input and output wiring for the system.
8. Replace the conduit landing plate.
9. Replace the top entry wireway access cover:
   - Replace the cover in the recessed opening.
   - Replace the four bolts that secure the cover.



Top Entry Terminal Block

Figure 18. BladeUPS Bar Top Entry Terminal Block

Table 4. BladeUPS Bar Wiring Specifications

BladeUPS Bar Terminal Block	Terminal Position	BladeUPS Bar Wire Function	Terminal Wire Size Rating*	Tightening Torque
Output	1 [Output A]	Phase 1 Out	13.3 mm² (6 AWG) to 177 mm² (350 kcmil) Wire gauge depends on overcurrent protection rating required (see Table 2 on page 26). Reference the NEC, NFPA 70 for wire sizing.	31.1 Nm (275 lb in)
	2 [Output B]	Phase 2 Out		
	3 [Output C]	Phase 3 Out		
Input	4 [Input A]	Phase 1 In		
	5 [Input B]	Phase 2 In		
	6 [Input C]	Phase 3 In		
Neutral	7	Neutral		
	8	Neutral		
	9	Neutral		
Safety Ground	Ground	Ground	2 mm² (14 AWG) to 52 mm² (1/0)	6 Nm (50 lb in)

* Use 13.3 mm² (6 AWG) 90°C copper wire minimum.

10. Remove the Wireway Access Cover.
    - Install and attach approved electrical conduit to the holes previously added to the conduit landing plate.
    - Pull approved electrical conductors for the system, and connect the input, output, and ground wires to the BladeUPS Bar top entry terminal block according to Figure 18 and Table 4.
    - Route the three input phases and the input neutral through the mounted or loosened ferrite assembly (see Figure 17).
11. Replace the cabinet top panel:
    - Locate the cabinet top panel.
    - Align the top panel with the protruding mounting screws in the front (three screws) and back (two screws).
    - Push down the top panel to snuggly fit over the screws.
    - Tighten the top panel screws.
12. Replace the trim:
    - Locate the top panel trim assemblies and the 12 screws that you removed previously.
    - Replace the outside pairs of trim screws on the first trim assembly, and then replace the interior trim screws.
    - Repeat to install the second trim assembly.
13. Replace the two upper side panels:
    - Locate the two upper side panels and the key.
    - Slide the bottom lip of the first panel into the track above the bottom panel.
    - Push the panel forward until it is flush with the rack frame.
    - Snap the panel into the latches.
    - Lock the upper side panels with the key.
    - Repeat to install the second panel.
14. **Five and six UPS preassembled systems only.** Continue to"Installing the UPS Internal Batteries" on page 39.

15. If installing optional EBM(s), continue to "EBM Installation" on page 43. Otherwise, go to "Parallel System Initial Startup" on page 51.

Bottom Entry Installation

Figure 19 shows input and output wiring in a bottom entry system.

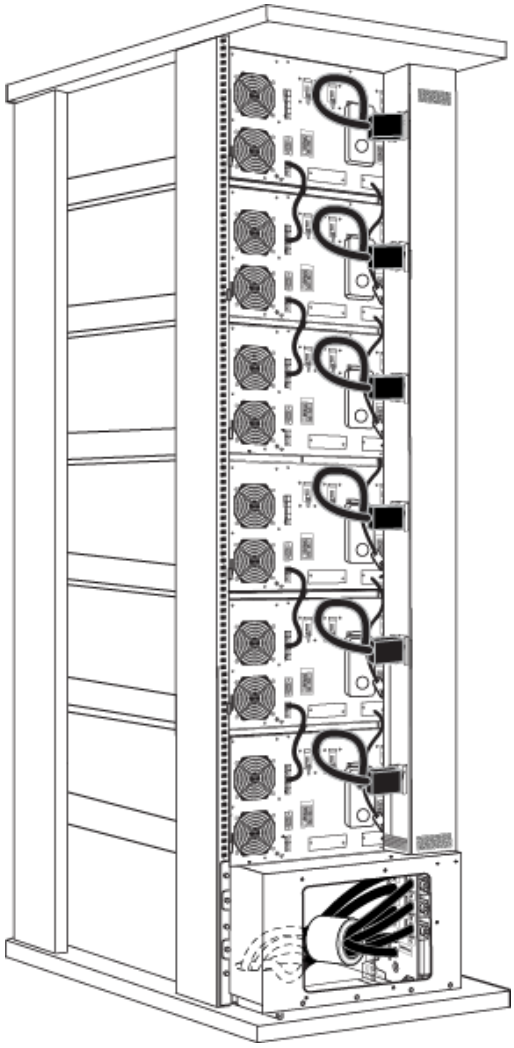


Figure 19. Bottom Entry Wiring Installation

To install the parallel system input and output wiring:

1. Verify that all battery circuit breakers on all UPSs are in the OFF (O) position (see Figure 20).

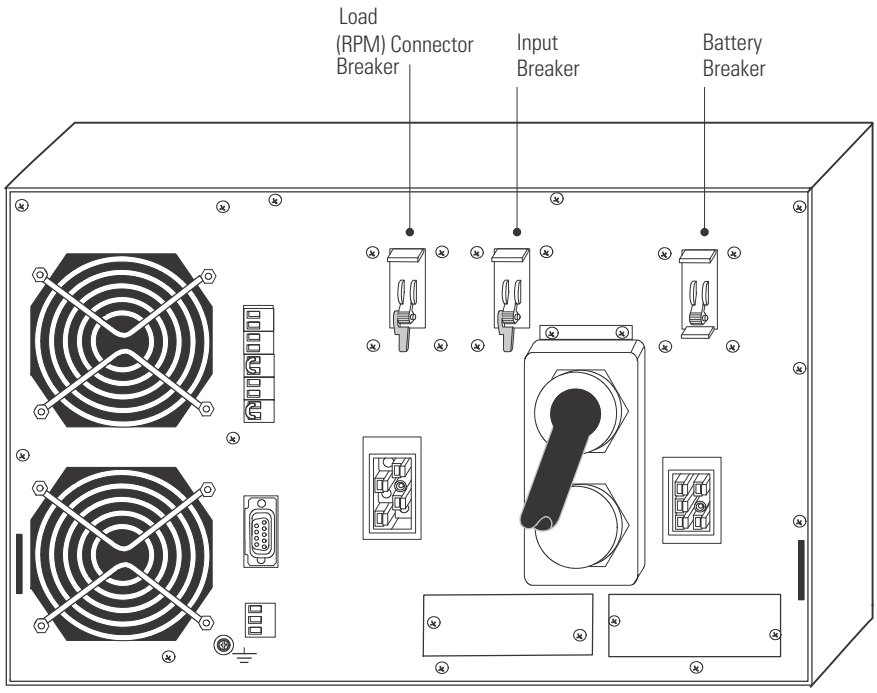


Figure 20. BladeUPS Module Rear Panel

2. Remove the five screws on the bottom entry wireway access cover and retain. Remove the cover and retain (see Figure 21).

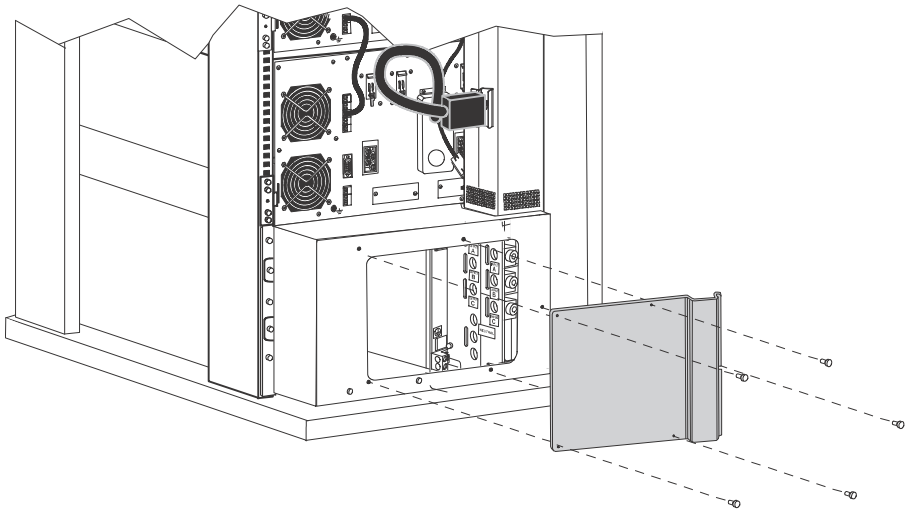


Figure 21. Removing the Wireway Access Cover (Bottom Entry Rack Shown)

3. Remove the six screws on the conduit landing plate and retain. Remove the plate and retain. See Figure 22.

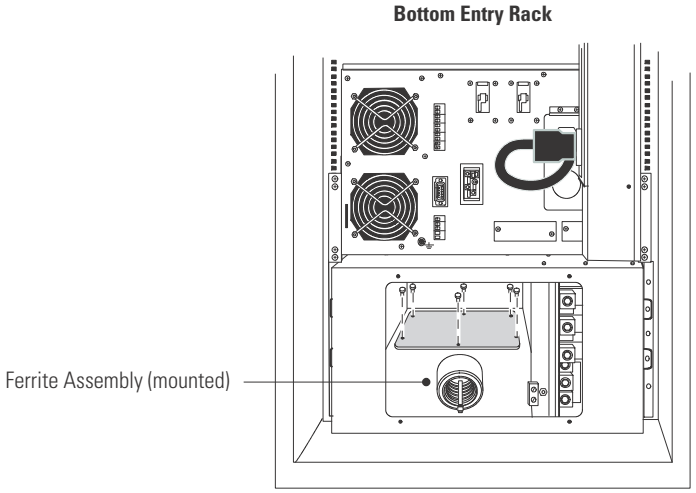


Figure 22. Removing the Conduit Landing Plate

4. Use a Greenlee® punch to provide one or more holes in the conduit landing plate to accommodate the input and output wiring from the utility to the BladeUPS Bar.
5. Replace the conduit landing plate, and attach approved electrical conduit to the plate.
6. Pull approved electrical conductors to the system and connect the input, output, and ground wires to the BladeUPS Bar terminal block according to Figure 18 and Table Route the three input phases and the input neutral through the mounted or loosened ferrite assembly (see Figure 23).

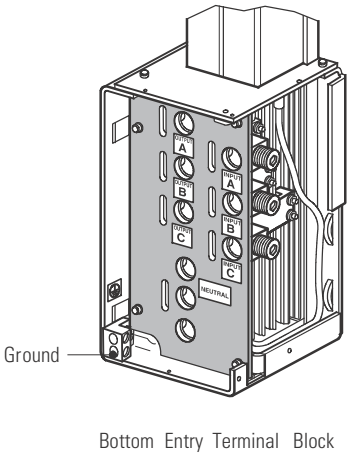


Figure 23. BladeUPS Bar Terminal Block

Table 5. BladeUPS Bar Wiring Specifications

BladeUPS Bar Terminal Block	Terminal Position	BladeUPS Bar Wire Function	Terminal Wire Size Rating*	Tightening Torque
Output	1 [Output A]	Phase 1 Out	13.3 mm² (6 AWG) to 177 mm² (350 kcmil) Wire gauge depends on overcurrent protection rating required (see Table 2 on page 26). Reference the NEC, NFPA 70 for wire sizing.	31.1 Nm (275 lb in)
	2 [Output B]	Phase 2 Out		
	3 [Output C]	Phase 3 Out		
Input	4 [Input A]	Phase 1 In		
	5 [Input B]	Phase 2 In		
	6 [Input C]	Phase 3 In		
Neutral	7	Neutral		
	8	Neutral		
	9	Neutral		
Safety Ground	Ground	Ground	2 mm² (14 AWG) to 52 mm² (1/0)	6 Nm (50 lb in)

* Use 13.3 mm² (6 AWG) 90°C copper wire minimum.

7. **Five and six UPS preassembled systems only.** Continue to the "Installing the UPS Internal Batteries". section.
8. If installing optional EBM(s), continue to "EBM Installation" on page 43. Otherwise, go to "Parallel System Initial Startup" on page 51.

Installing the UPS Internal Batteries

Preassembled systems that have five or six UPSs are shipped with the batteries for the top two UPSs on the pallet outside of the rack.

⚠ CAUTION

The UPS internal batteries are heavy (see page 130). Each battery tray holds two rows of five batteries. Use caution when handling the heavy battery trays.

To install the battery trays into the UPS 5 cabinet:

1. Verify that all battery circuit breakers on all UPSs are in the OFF (O) position (see Figure 24).

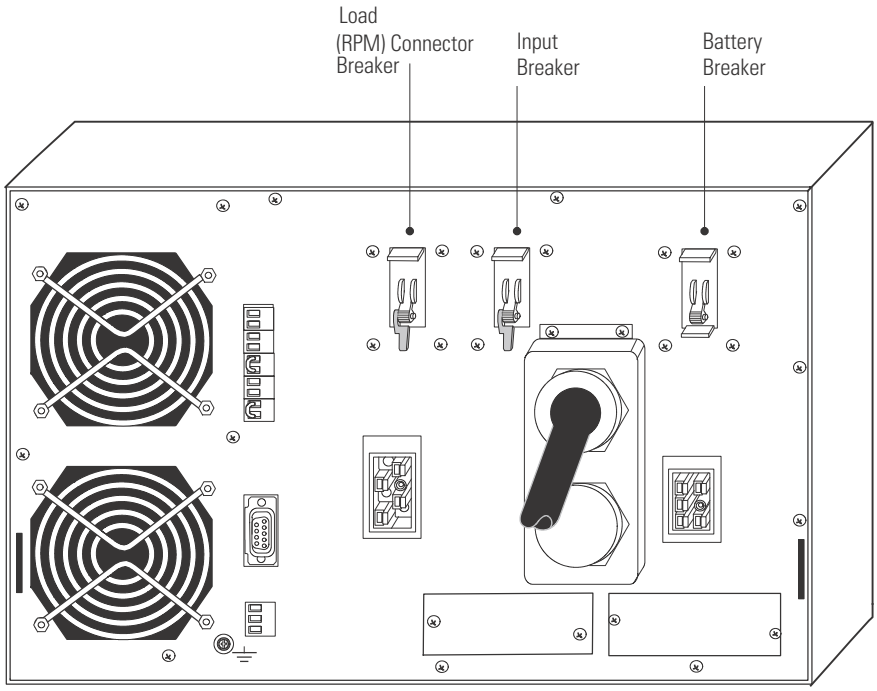


Figure 24. BladeUPS Module Rear Panel

NOTE The load connector breaker controls the load connector only, not the output power cord.

2. Remove the UPS front cover and set it aside (see Figure 25).

   Grasp the fingergrips on both sides of the cover and pull the cover forward firmly. Unplug the LCD cable connecting the back of the control panel to the electronics module.

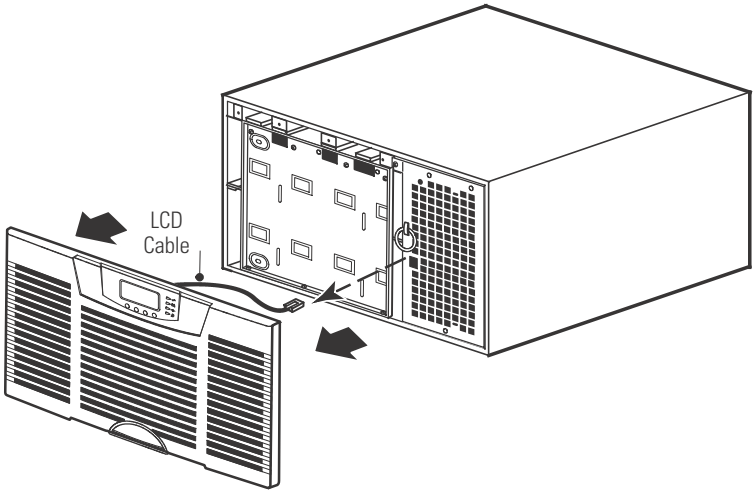


Figure 25. Removing the UPS Front Cover

3. Remove the eight screws on the battery cover plate and retain. Remove the plate and retain. See Figure 26.

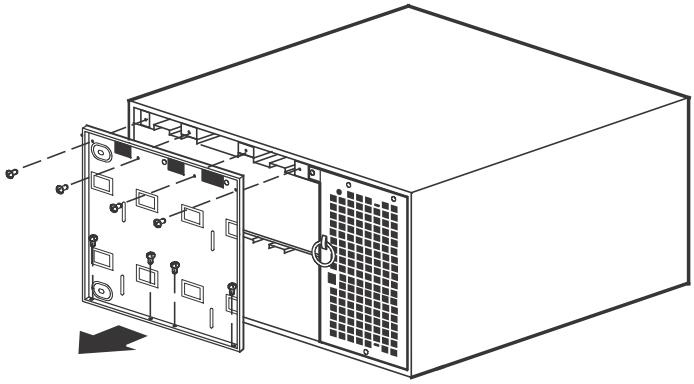


Figure 26. Removing the UPS Battery Cover Plate

4. Slide the battery trays into the cabinet (see Figure 27 for two battery string installations or Figure 28 for single-string installations). Verify that each tray is properly aligned before sliding in the tray.

NOTE When installing single-string battery trays for BladeUPS 5.1 kVA, always install the single-string trays in the bottom battery compartment.

5. When a tray is fully installed, tuck the plastic handle on the end of the tray into place.

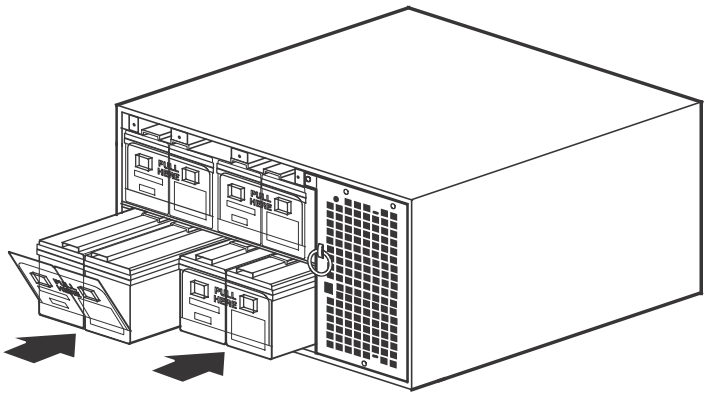


Figure 27. Installing the UPS Battery Trays (Two Strings)

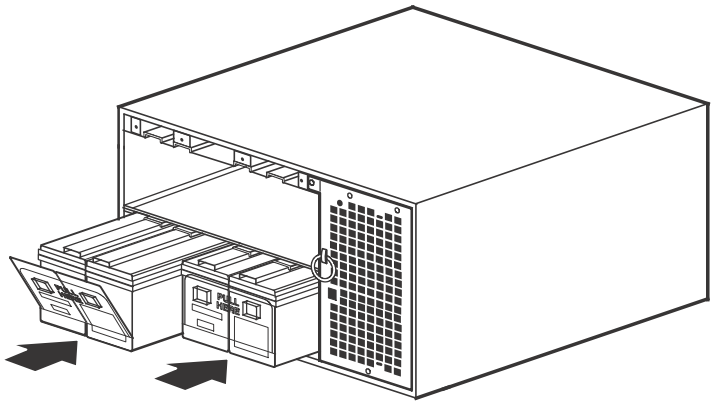


Figure 28. Installing the UPS Single-string Battery Trays for 5.1 kVA BladeUPS

6. Reinstall the battery cover plate.
7. Install the UPS front cover (see Figure 29):

   Plug the LCD cable from the control panel on the front cover into the connector on the electronics module. Use care to loop the LCD cable gently in front of the electronics module.

   Push the top of the front cover firmly into place, and then push the bottom firmly into place.

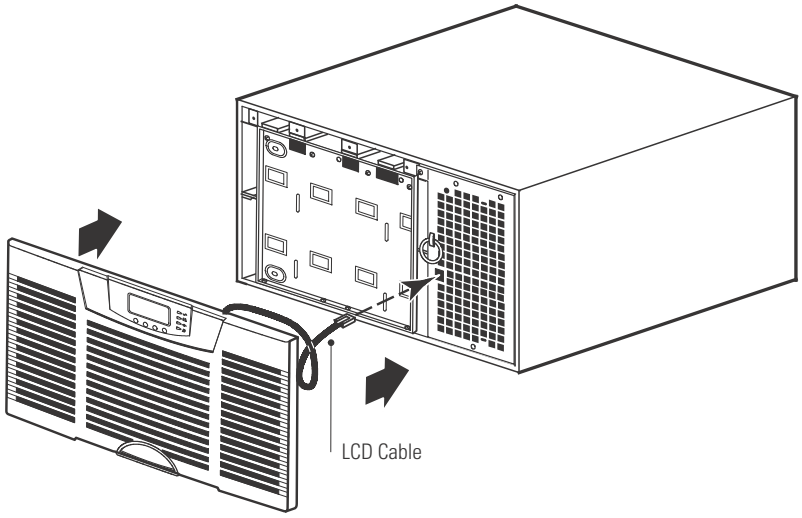


Figure 29. Installing the UPS Front Cover

8. **For six UPS preassembled systems only.** Repeat Steps 1 through 7 for UPS 6.
9. If installing optional EBM(s), continue to the "EBM Installation" section. Otherwise, continue to "Parallel System Initial Startup" on page 51.

EBM Installation

The BladeUPS EBM comes with all hardware required for installation in a standard EIA or JIS seismic rack-mount configuration with square and round mounting holes. The rail assemblies adjust to mount in standard 19-inch racks with front to rear rail distances from 61 to 81 cm (26 to 32 inches) deep. Figure 30 shows an example EBM installation.

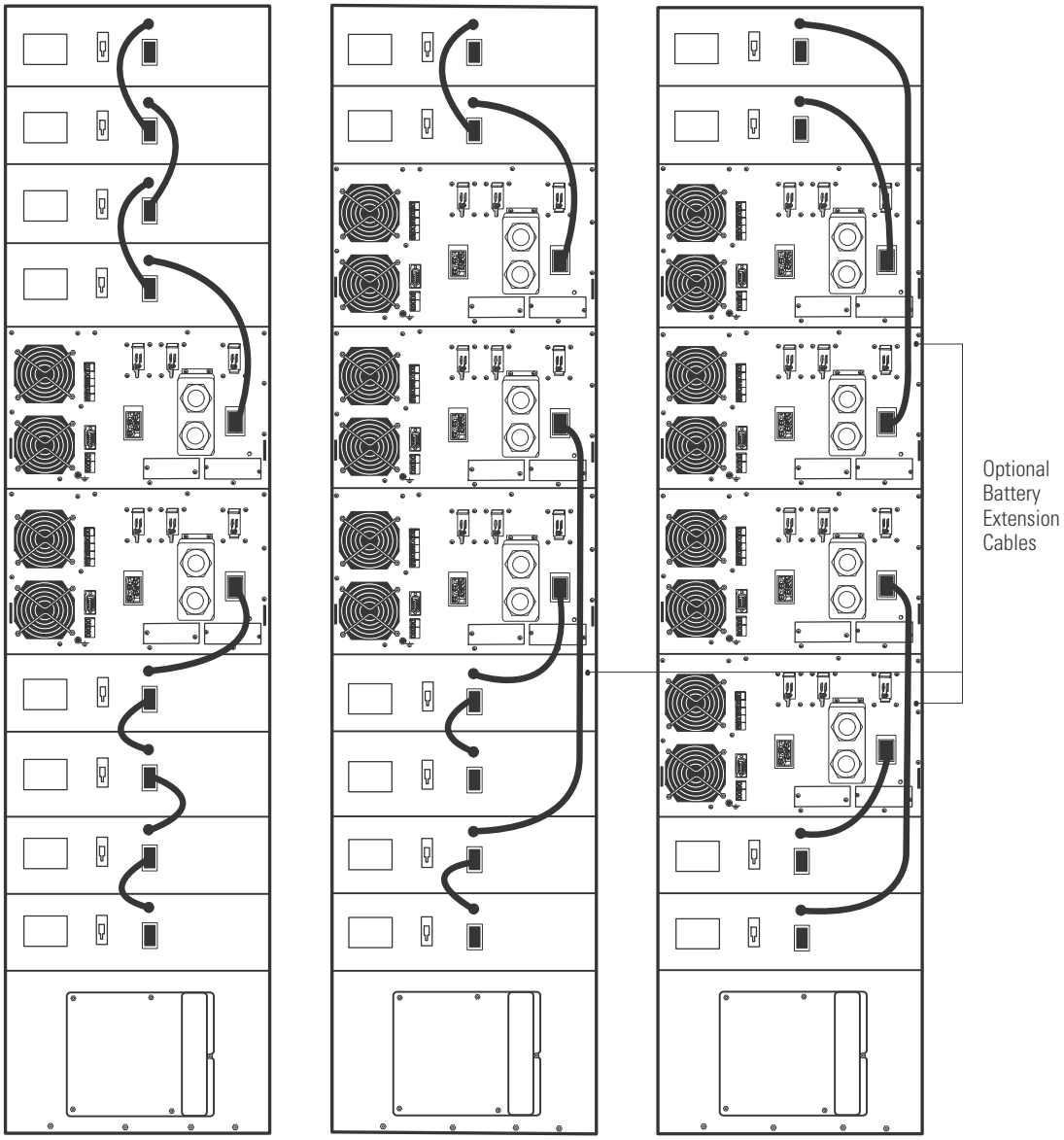


Figure 30. Example EBM Installations in Parallel Systems

Checking the EBM Accessories

Verify that the following items are included with the EBM:

- EBM front cover
- Mounting brackets and fasteners (if not already installed):
  - (2) mounting brackets
  - (4) 6-32 flat-head screws
- Rails and fasteners:
  - (2) sliding rail assemblies (left and right)
  - (2) rear hold-down brackets
  - (12) hex-head screws
  - (4) U-shaped 10-32 clip nuts
- EBM user's guide

NOTE Discard the EBM user's guide. Use this user's guide to install the EBM.

Rack Setup for the EBM

CAUTION

The EBM is heavy (see page 130). Removing the EBM from its carton requires a minimum of two people. Use the corrugated lifting sling (packaged with the UPS) to move the UPS.

NOTE Mounting rails are required for each individual cabinet.

To install the EBM rail kit:

1. Loosen the assembly wing nuts on both rail assemblies and adjust the rail size for the depth of your rack (see Figure 31).

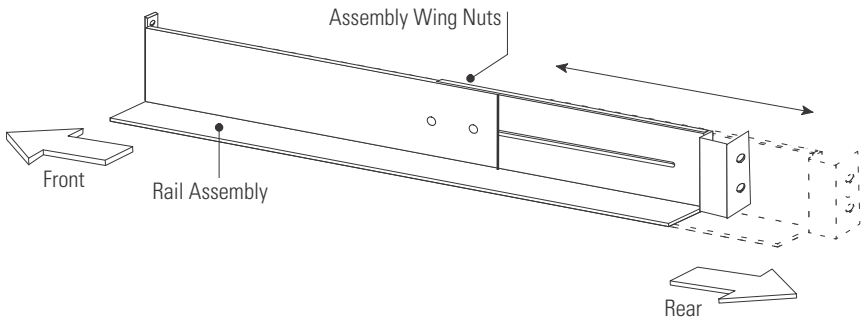


Figure 31. Adjusting the Rail Depth

2. Select the proper holes in the rail for positioning the EBMs in the rack.

   Place the first rail for the first EBM above the UPS, using positions 37 and 42 for the front hex-head screws. If you are installing additional rails, place the next rail 4 holes above the last installed screw (see Figure 32).

NOTE Verify that the hole patterns on the rails and mounting brackets align with the hole pattern on the rack.

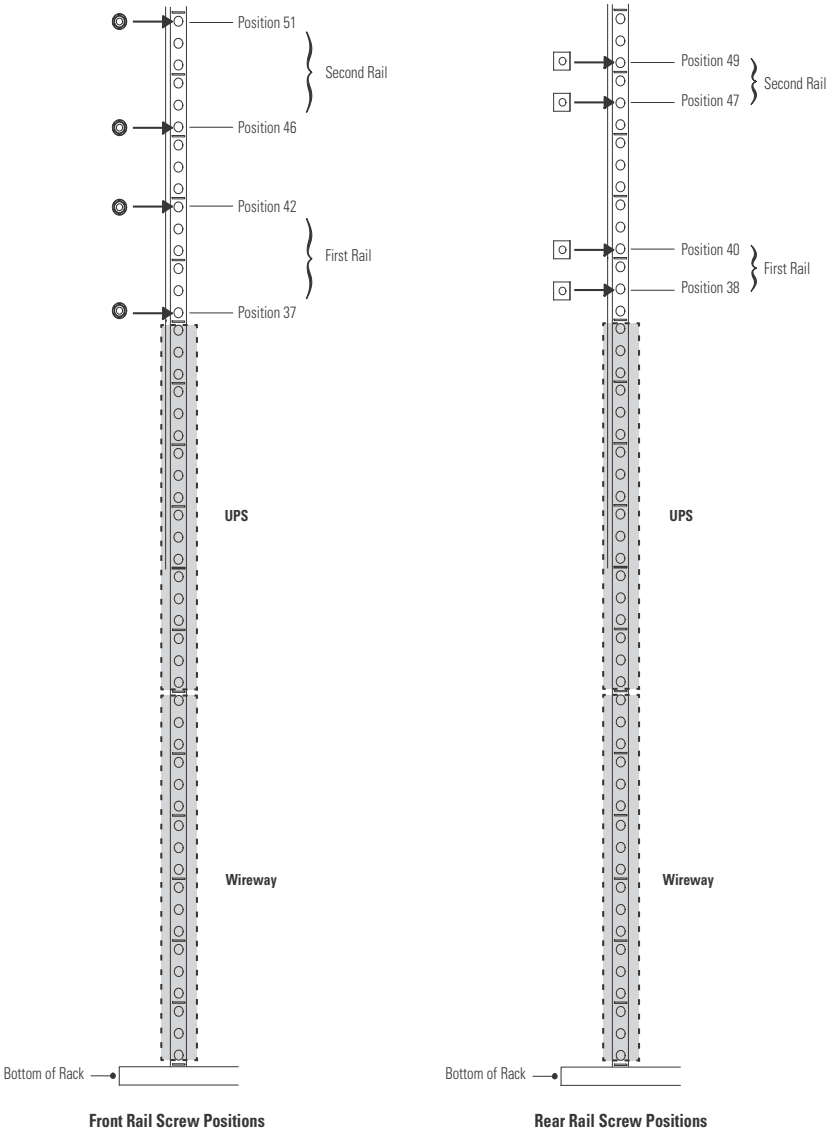


Figure 32. Rail Screw Positions for the EBM (Single UPS and Parallel Wireway with Two EBMs Shown)

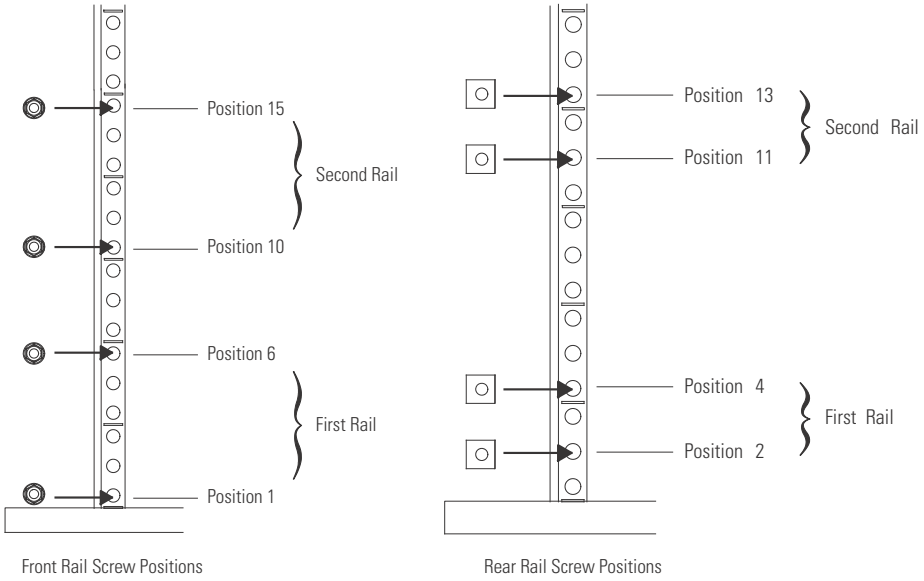


Figure 33. Rail Screw Positions for the EBM Bottom Installation

3. Secure the rail to the front of the rack with two hex-head screws (see Figure 34).

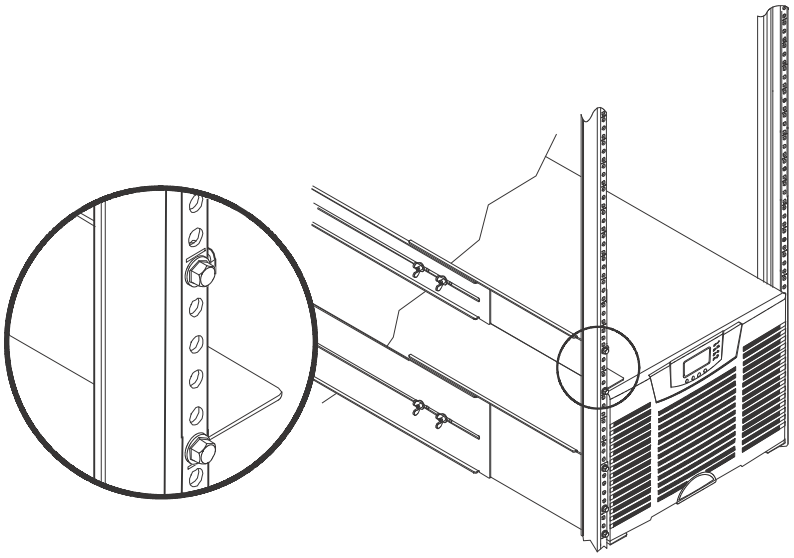


Figure 34. Securing the Front Rail

4. Using two clip nuts and two hex-head screws, attach the rail to the rear of the rack (see Figure 32 on page 45 and Figure 35).

   The bottom rail uses positions 38 and 40 for the rear hex-head screws. If you are installing additional rails, place the next rail 7 holes above the last installed screw.

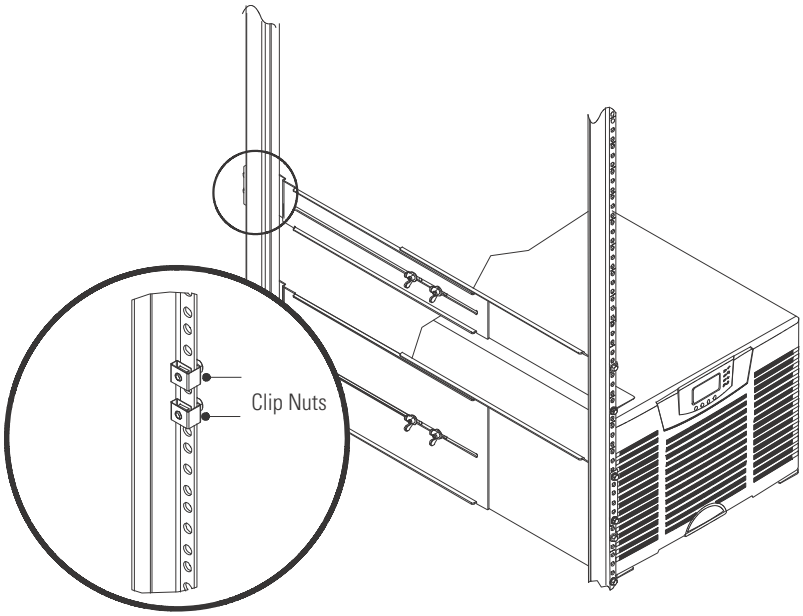


Figure 35. Securing the Rear Rail

5. Repeat Steps 3 and 4 for the other rail.
6. Tighten the assembly wing nuts on both rail assemblies.

⚠ CAUTION

The EBM is heavy (see page 130). Moving the EBM requires a minimum of two people.

7. Place the EBM on a flat, stable surface with the front of the EBM facing toward you.
8. If the mounting brackets are not already installed, align the two mounting brackets with the screw holes on the side of the EBM and secure with the supplied 6-32 flat-head screws (see Figure 36).
9. Attach the EBM front cover:

   Align the pins on the rear of the front cover with the openings in the EBM. Push the cover firmly into place. See Figure 36.

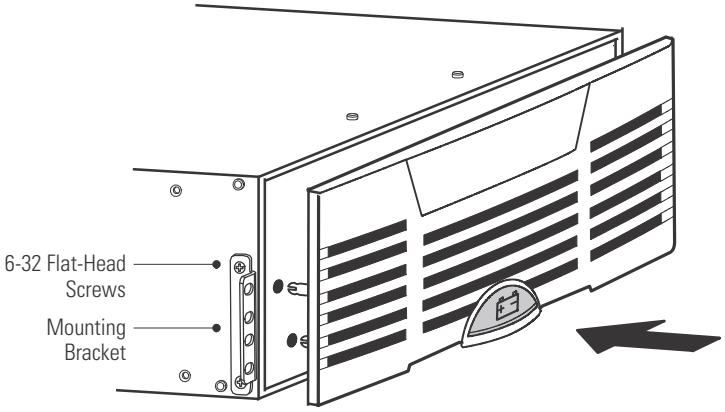


Figure 36. Installing the EBM Mounting Brackets

10. Slide the EBM into the rack.

11. Secure the front of the EBM to the rack using two hex-head screws in each mounting bracket as shown in Figure 37.

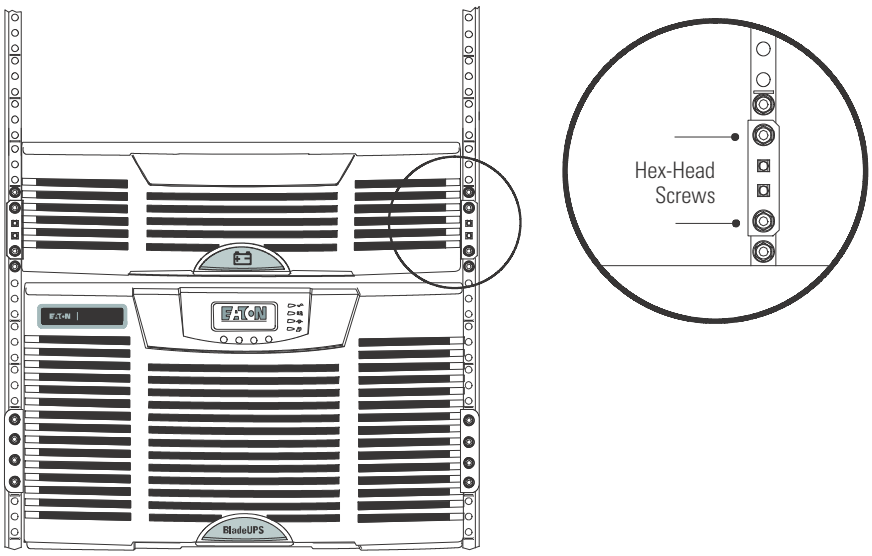


Figure 37. Securing the EBM Mounting Brackets

12. Attach the rear hold-down brackets to the rail and slide the brackets into the slots on the EBM rear panel (see Figure 38).

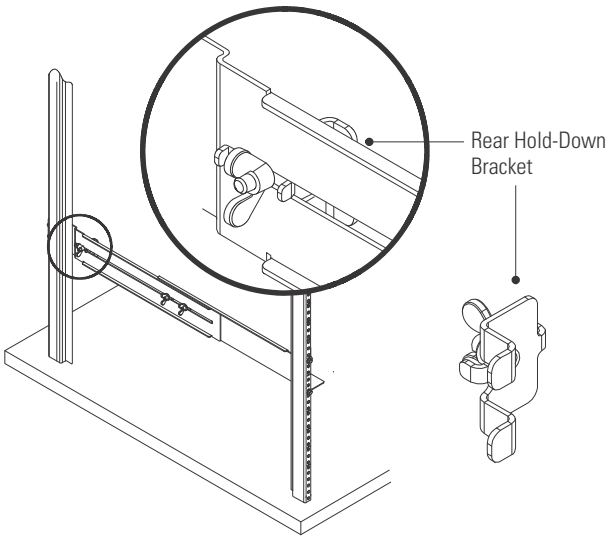


Figure 38. Securing the Back of the EBM

13. Verify that the brackets are seated firmly, then tighten the wing nuts on the rear hold-down brackets. The EBM is now secured in the rack.

⚠ CAUTION

A small amount of arcing may occur when connecting an EBM to the UPS. This is normal and will not harm personnel. Insert the EBM cable quickly and firmly into the UPS battery connector.

14. Verify that all battery circuit breakers on all UPSs are in the OFF (O) position (see Figure 39).
15. Plug the EBM cable(s) into the battery connector(s) as shown in Figure 39. Up to four EBMs may be connected to each UPS.
16. **Parallel system only.** Repeat Steps 14 and 15 for each UPS with EBM(s).

    See Figure 40 on page 50 and Figure 41 on page 51 for examples of EBM connections in a parallel system.

NOTE Each UPS in a parallel system must have the same number of EBMs.

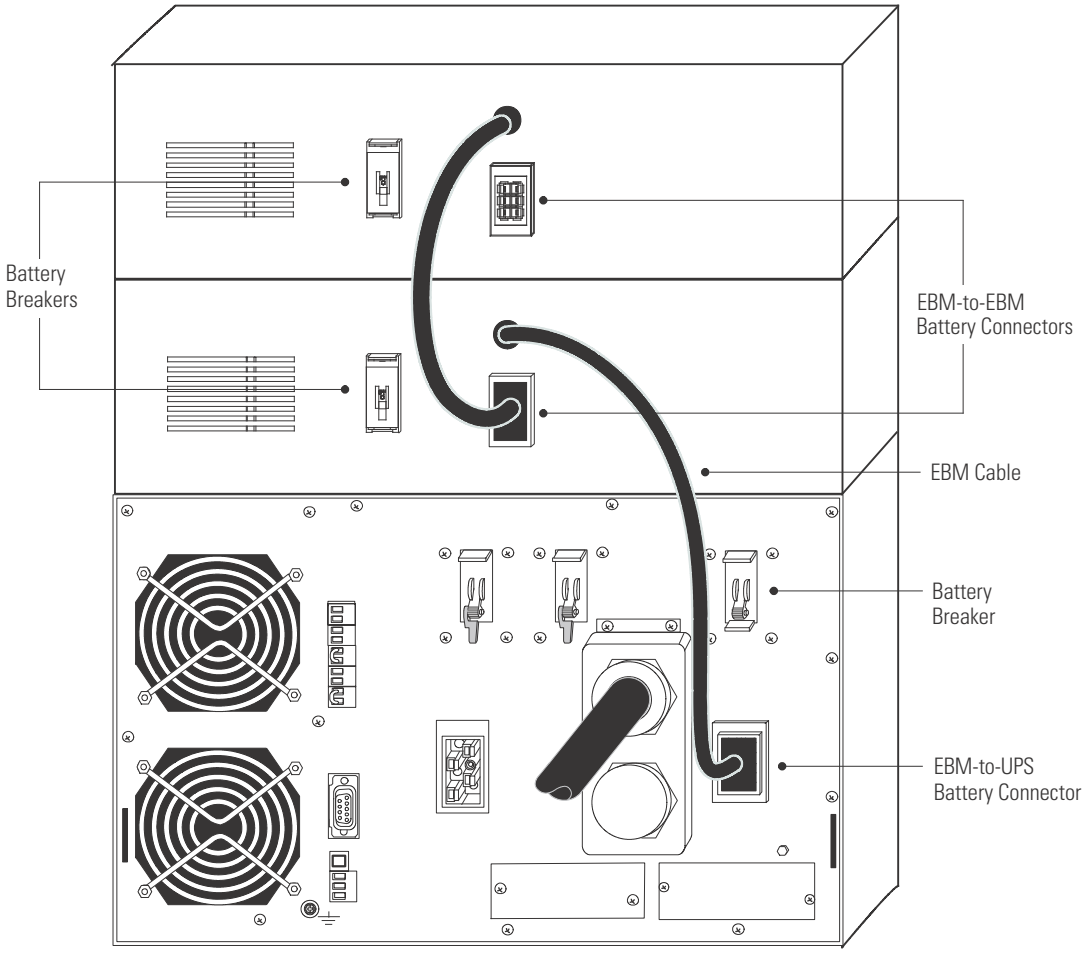


Figure 39. Typical EBM Installation

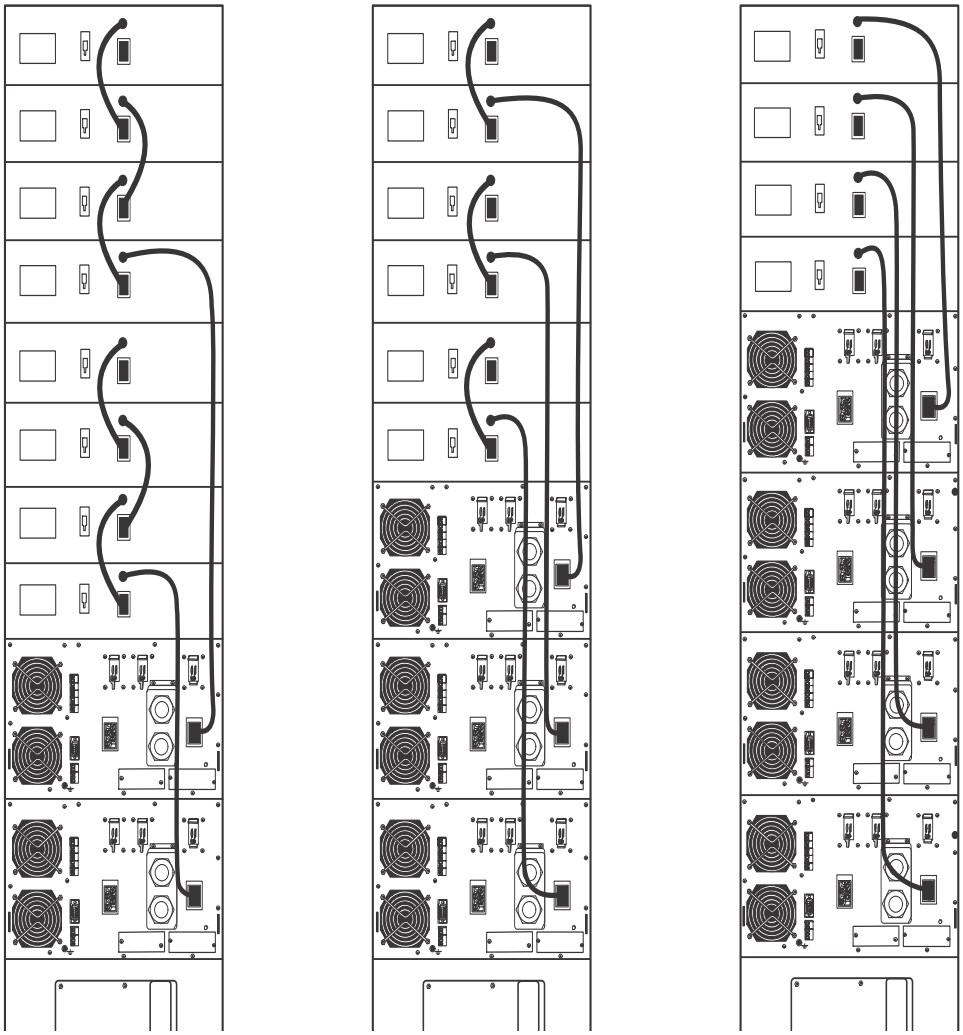


Figure 40. Example EBM Installations in Preassembled Parallel Systems

NOTE Figure 40 shows systems using the supplied EBM cables and optional 0.9m (3 ft) battery extension cables.

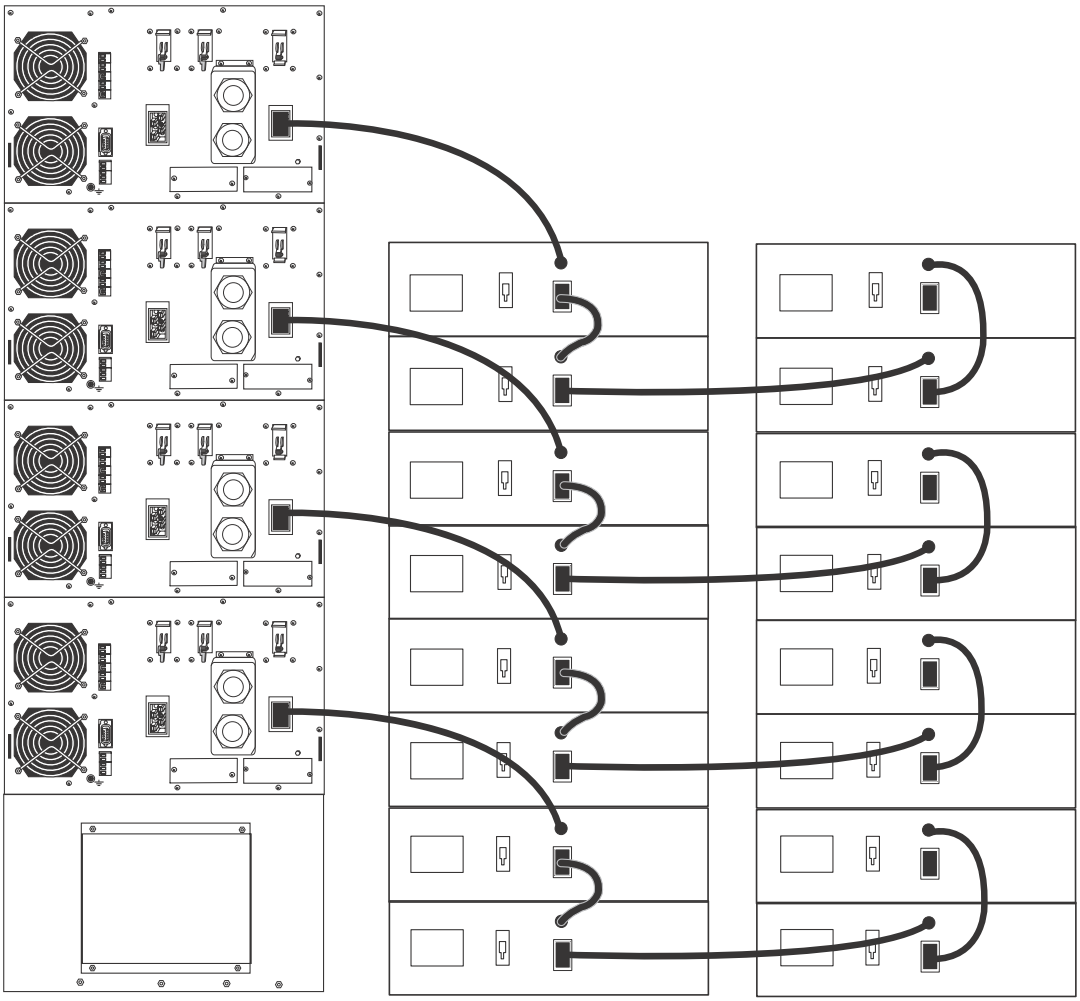


Figure 41. Example EBM Installation in a Large Parallel System

Parallel System Initial Startup

To start up a parallel system:

NOTE Verify that the total equipment ratings do not exceed the parallel system capacity to prevent an overload alarm.

1. Verify that all circuit breakers on all UPSs are in the OFF (O) position (see Figure 24 on page 40).

NOTE The load connector breaker controls the load (RPM) connector only, not the output power cord.

2. Switch on utility power where the UPS is connected.
3. Remove the breaker ties from the battery circuit breakers.
4. Switch the UPS input circuit breaker on each UPS to the ON (|) position.
5. Wait for the front panel display on each UPS to illuminate.

   The ⚠ indicator flashes on each UPS.
6. Check each UPS front panel display for active alarms or notices (other than "Batteries Disconnected"). Resolve any active alarms before continuing. See "Troubleshooting" on page 135.
7. Switch all UPS battery circuit breakers to the ON (|) position.
8. If optional EBMs are installed, switch all EBM battery circuit breakers to the ON (|) position.
9. Verify that the "Batteries Disconnected" alarm on each UPS has cleared. Verify that no other alarms appear on any UPS front panel display.

   If an ⚠ indicator is flashing on any UPS, do not proceed until all alarms are clear. Check the UPS status from the front panel to view the active alarms. Correct the alarms and restart if necessary.
10. On any UPS, press any button on the front panel display to activate the menu options, and then press the button until the TURN UPS ON/OFF menu displays.
11. Press the → button to display the TURN SYSTEM ON option; press the ↵ button.
12. Confirm the selection. Press and hold the ↵ button for three seconds, until the UPS stops beeping.

    Verify that the ⏻ indicator illuminates solid on each UPS, indicating that the UPS is operating normally and any loads not connected through the load connector are now energized.

    If the ⚠ indicator on any UPS is flashing, do not proceed until all alarms are clear. Check the UPS status from the front panel to view the active alarms. Correct the alarms and restart if necessary.

NOTE For a parallel-ready system (a single UPS installed to be part of a future parallel system), set the Parallel Operation Settings / Parallel Operation Mode to "Capacity Mode" to prevent unnecessary alarms (see Chapter 5, "Operation").

Each UPS should be in Normal mode. By default, Normal mode operates on the High Efficiency setting (see "Normal Mode" on page 97).

13. To energize loads connected through the load connectors, switch all load connector circuit breakers to the ON (|) position.
14. On any UPS, press the ESC button until the Start screen appears.
15. Verify that all UPSs in the parallel system are updated to the same firmware version.

NOTE Firmware v2.0 does not operate in a parallel system with v1.xx. All UPSs must have firmware v2.x installed.

On each UPS, press any button on the front panel display to activate the menu options, and then press the button until the IDENTIFICATION menu displays. Press the ↵ button to display the identification data, including the firmware version.

If any firmware versions do not match, install the firmware from the supplied BladeUPS: Documents, Firmware, and Installation Video CD or visit www.eaton.com/powerquality to download the latest version and the instructions for installing it.

16. If optional EBMs are installed, see "Configuring the UPS for EBMs" on page 104 to set the number of installed EBMs for each UPS.

17. To change any other factory-set defaults, see "Operation" on page 93.

NOTE 1 Eaton recommends setting the Date and Time and the Start screen.

NOTE 2 Verify that the Parallel Operation Settings are set appropriately for your system. For example, if you know the load will exceed the redundancy level of the system, set the Parallel Operation Mode to "Capacity Mode" to prevent unnecessary alarms (see Chapter 5, "Operation").

18. If you installed an optional REPO, test the REPO function:

    Activate the external REPO switch. Verify the status change on the UPS display.

    Deactivate the external REPO switch and restart the UPS.

19. See "Updating the UPS Firmware" on page 128.

NOTE 1 When adding a new UPS to a parallel system or updating one UPS's firmware, verify that all UPSs in the parallel system are updated to the same firmware version.

NOTE 2 The batteries charge to 80% capacity in less than 5 hours. However, Eaton recommends that the batteries charge for 48 hours after installation or if the system is off for more than 30 days.

Chapter 4 Standard System Installation

For standard systems, the BladeUPS modules are installed in the rack after delivery.

This chapter explains:

- Equipment inspection
- Required tools
- Unpacking the cabinet
- Parallel system setup
- Extended Battery Module (EBM) setup and installation (optional)
- UPS setup and installation, including UPS internal batteries
- Parallel installation (optional)
- Initial startup

NOTE For instructions on how to install the optional Maintenance Bypass Module (MBM), refer to the user's guide for the MBM.

Inspecting the Equipment

If any equipment has been damaged during shipment, keep the shipping cartons and packing materials for the carrier or place of purchase, and file a claim for shipping damage. If you discover damage after acceptance, file a claim for concealed damage.

To file a claim for shipping damage or concealed damage: 1) File with the carrier within 15 days of receipt of the equipment; 2) Send a copy of the damage claim within 15 days to your service representative.

NOTE Check the battery recharge date on the shipping carton label. If the date has expired and the batteries were never recharged, do not use the UPS. Contact your service representative.

Tools Required

To assemble the components, you may need the following tools:

- Medium flat-bladed screwdriver
- Short-handled #2 Phillips screwdriver
- Long-handled #2 Phillips screwdriver
- 7 and 8 mm wrench or socket

Unpacking the Components

CAUTION

- Unpacking the cabinet in a low-temperature environment may cause condensation to occur in and on the cabinet. Do not install the cabinet until the inside and outside of the cabinet are absolutely dry (hazard of electric shock).
- The cabinet and batteries are heavy (see page 136). Removing the cabinet and batteries from their cartons requires a minimum of two people.

NOTE To protect the product, leave the components packaged until they are ready to install.

Follow these guidelines when unpacking the cabinet and accessories:

- Cut the pallet straps and remove the large cardboard outer sleeve. Have two people lift the sleeve for easier removal.
- Use care when moving and opening the cartons.
- Discard or recycle the packaging in a responsible manner, or store it for future use.
- Do not install the batteries until after the cabinet is installed in the rack.

Follow these guidelines when locating the cabinet after unpacking:

- Place the cabinet in a protected area that has adequate airflow and is free of humidity, flammable gas, and corrosion.
- Avoid placing the cabinet on its side. Verify that the air vents on the front and rear of the cabinet are not blocked.
- Allow 1m (3 ft) floor space in the front and rear of the rack for safety and access for maintenance.

If installing a parallel system, continue to the "Parallel System Setup"section.

If installing a standalone UPS and optional EBM(s), continue to "EBM Installation" on page 43. Otherwise, continue to "UPS Setup" on page 63.

Parallel System Setup

WARNING

Only qualified service personnel (such as a licensed electrician) shall perform the electrical installation. Risk of electrical shock.

The system identifies a UPS connected to a BladeUPS Bar with a paralleling line cord as a member of the parallel system. The BladeUPS Bar connects the line and load to a common power bus. You can configure parallel systems for capacity or redundancy.

UPSs in a parallel configuration require a dedicated branch circuit that meets the following requirements:

- Three-phase, 4-wire plus ground, 208Y/120V nominal (BladeUPS 12 model) or 400Y/230V nominal, 380–415 Vac acceptable (BladeUPS 12i model)
- 50/60 Hz
- Wall-mounted breaker that is readily accessible to the operator
- Flexible or rigid metal conduit
- Circuit with overcurrent protection, depending on parallel configuration (see Table 6)

Table 6. BladeUPS Overcurrent Protection

Number of UPSs in Parallel System	BladeUPS 12 Model	BladeUPS 12i Model
1	50A	32A
2	100A	63A
3	150A	75A
4	200A	100A
5	225A	125A
6 (N+1 System)	225A	160A

NOTE For ease of wiring access with bottom entry, place the rack containing the UPSs on a raised floor.

Preparing the Rack

To prepare the rack for wiring:

1. Verify that all packaging material is removed from the rack.
2. Verify that the following items are included with the rack:
   - (4) door keys
   - (1) package rack hardware including:
     - M6 clip nuts and screws
     - 10-32 cage nuts and screws
     - 1/4 x 20 rack baying screws and nuts
     - 8-32 attachment screws
3. Verify operation of the rack door handle:

   To open the door, pull out on the handle.

   To close the door, push in on the handle until it snaps into place.
4. Verify that the supplied keys lock and unlock the door.
5. **Optional.** You may flip the rack door to allow it to open from the opposite side. To flip the door:
   a. Remove the door ground wire nut and wire connector from the ground stud (if equipped).
   b. Pinch together the spring loaded hinge pin clips, then rotate and lock open both top and bottom hinge pins.

WARNING

Use caution so door does not fall and cause an injury

c. Lift off the door and set aside

d. Remove the door hinges and flip 180° to mount them on corresponding attachment holes on opposite side of the rack.

e. Pinch together top and bottom of the plastic grabber latch clips from inside the rack frame to remove them from rack frame. Put them in the corresponding square holes in the opposite side of the rack frame

f. Replace the door by flipping it upside down, then align the hinge pin assemblies and latch into place by rotating the locked-out pins to allow them to lock into the hinge plates

g. Remove the door handle and lock assembly from inside the door. Flip them upside down and re-install them into the door frame

h. Remove the two screws that secure the two grabber latch keepers. Flip both of the grabber latch keepers upside down and reinstall them in the door frame.

i. Try closing door. If it does not fit properly, you may need to loosen the keeper latches and door lock assembly to provide proper fit.

j. Move the Eaton logo to the upper part of the door.

6. **Optional.** For ease of installation, remove the rack side panels, especially the panel on the side nearest the BladeUPS Bar.

7. Plan where each cabinet will be located in the rack and determine the "U" marks to use for mounting the rails. For example, for a rack containing six UPSs and a bottom wireway, plan to mount the bottom of the rails at the following marks (see Figure 42):

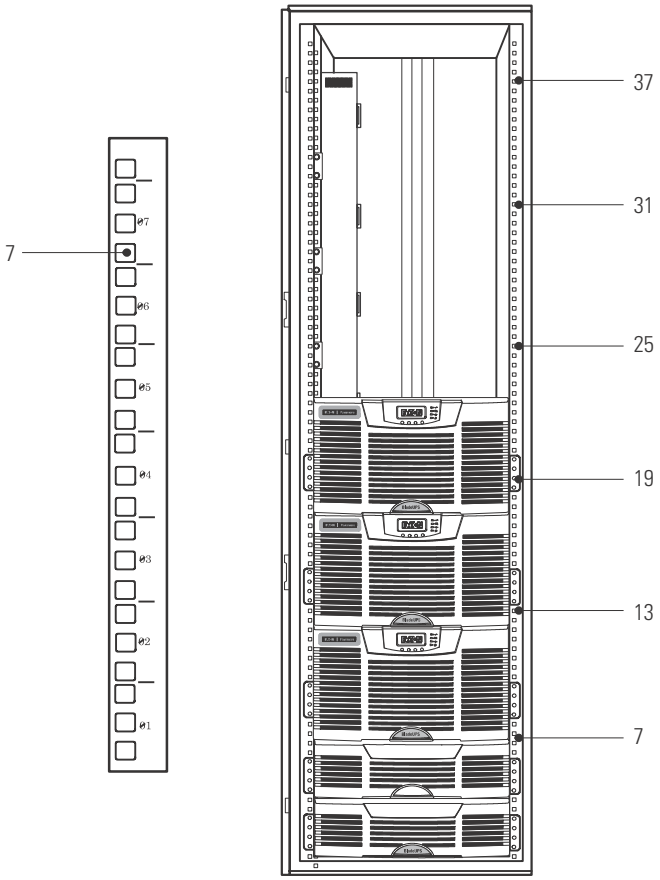


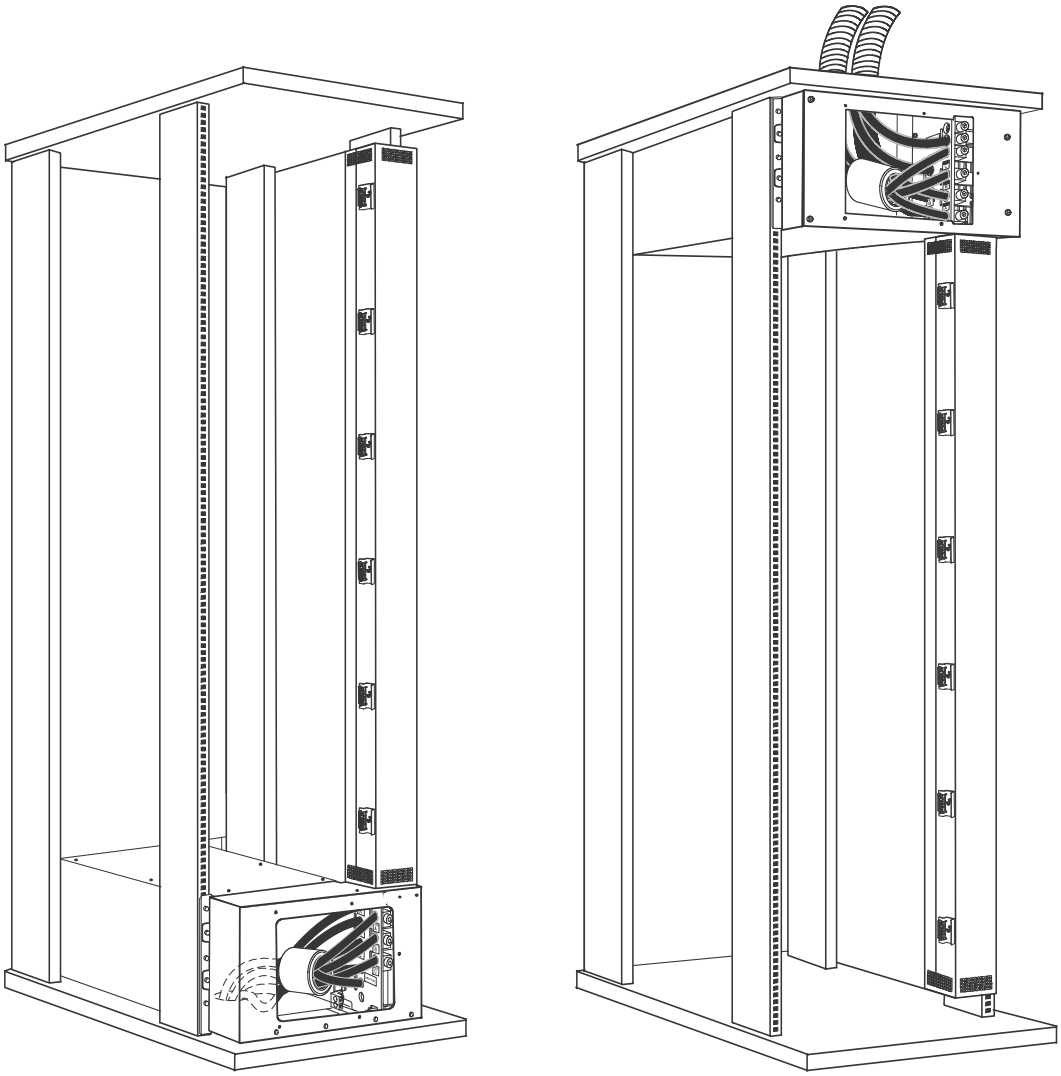
Figure 42. Recommended Rail Locations (Example Configuration)

NOTE Recommended rail locations are for example only. Adjust the locations as needed for your system's configuration. Allow for hole spacing and numbering (see Figure 42). For guidelines for configuring a parallel system with EBMs, see page 3.

8. Continue to the "Installing the Input and Output Wiring" section.

Installing the Input and Output Wiring

Figure 43 shows input and output wiring in a bottom entry rack and a top entry rack.



Wiring in a Bottom Entry Rack

Wiring in a Top Entry Rack

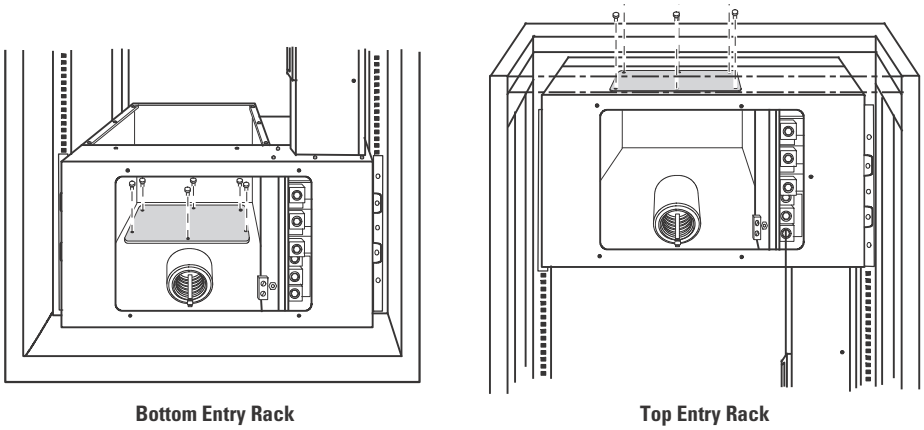
Figure 43. Wiring Entry Options

To install the parallel system input and output wiring:

1. Remove the five screws on the wireway access cover and retain. Remove the cover and retain.

NOTE For top wireway applications, see "top of cabinet" removal instructions in "Top Entry Installation", Step 2 on page 30.

2. Remove the six screws on the conduit landing plate and retain. Remove the plate and retain. See Figure 44.

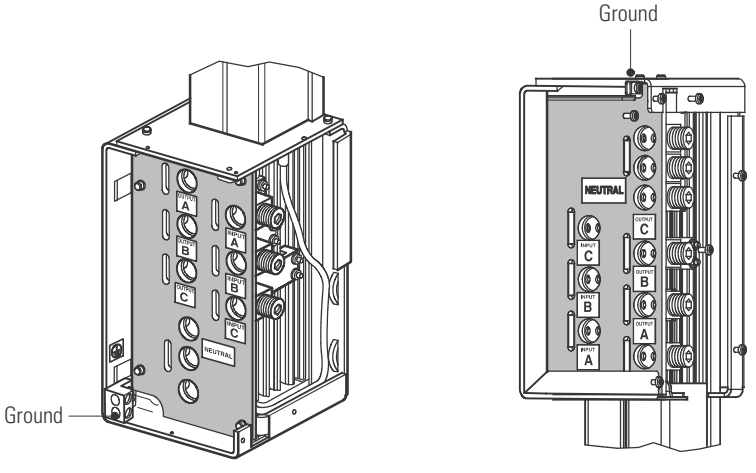


Bottom Entry Rack

Top Entry Rack

Figure 44. Removing the Conduit Landing Plate

3. Use a Greenlee® punch to provide one or more holes in the conduit landing plate to accommodate the input and output wiring for the system.
4. Replace the conduit landing plate.
5. Replace the top entry wireway access cover:
   - Replace the cover in the recessed opening.
   - Replace the four bolts that secure the cover.



Bottom Entry Terminal Block

Top Entry Terminal Block

Figure 45. BladeUPS Bar Terminal Block

Table 7. BladeUPS Bar Wiring Specifications

BladeUPS Bar Terminal Block	Terminal Position	BladeUPS Bar Wire Function	Terminal Wire Size Rating*	Tightening Torque
Output	1 [Output A]	Phase 1 Out	13.3 mm² (6 AWG) to 177 mm² (350 kcmil) Wire gauge depends on overcurrent protection rating required (see Table 6 on page 57). Reference the NEC, NFPA 70 for wire sizing.	31.1 Nm (275 lb in)
	2 [Output B]	Phase 2 Out		
	3 [Output C]	Phase 3 Out		
Input	4 [Input A]	Phase 1 In		
	5 [Input B]	Phase 2 In		
	6 [Input C]	Phase 3 In		
Neutral	7	Neutral		
	8	Neutral		
	9	Neutral		
Safety Ground	Ground	Ground	2 mm² (14 AWG) to 52 mm² (1/0)	6 Nm (50 lb in)

* Use 13.3 mm² (6 AWG) 90°C copper wire minimum.

6. Remove the Wireway Access Cover.
   - Install and attach approved electrical conduit to the holes previously added to the conduit landing plate.
   - Pull approved electrical conductors for the system, and connect the input, output, and ground wires to the BladeUPS Bar top entry terminal block according to Figure 45 and Figure 7.
   - Route the three input phases and the input neutral through the mounted or loosened ferrite assembly (see Figure 44).
7. Replace the cabinet top panel:
   - Locate the cabinet top panel.
   - Align the top panel with the protruding mounting screws in the front (three screws) and back (two screws).
   - Push down the top panel to snuggly fit over the screws.
   - Tighten the top panel screws.
8. Replace the trim:
   - Locate the top panel trim assemblies and the 12 screws that you removed previously.
   - Replace the outside pairs of trim screws on the first trim assembly, and then replace the interior trim screws.
   - Repeat to install the second trim assembly.
9. Replace the two upper side panels:
   - Locate the two upper side panels and the key.
   - Slide the bottom lip of the first panel into the track above the bottom panel.
   - Push the panel forward until it is flush with the rack frame.
   - Snap the panel into the latches.
   - Lock the upper side panels with the key.
   - Repeat to install the second panel.

10. If installing optional EBM(s), see "EBM Installation" on page 43.
    Otherwise, continue to "UPS Setup" on page 63.

NOTE If you are installing the EBM with a new UPS at the same time, use the UPS user's guide to install both the UPS and the EBM.

NOTE Mounting rails are required for each individual cabinet.

UPS Setup

The UPS comes with all hardware required for installation in a standard EIA or JIS seismic rack-mount configuration with square and round mounting holes. The rail assemblies adjust to mount in 48-cm (19-inch) racks with front to rear rail distances from 61 to 76 cm (24 to 30 inches) deep.

Checking the UPS Accessories

Verify that the following items are included with the UPS:

- UPS front cover
- Communication terminal block connectors:
  - (3) two-pin connectors
  - (2) two-pin connectors with jumpers
  - (1) three-pin connector
- (2) wire saddles
- Communication cable (DB-9/DB-9)
- Documentation and software tools
  - Software Suite CD
  - BladeUPS: Documents, Firmware, and Installation Video CD
  - This user's guide
- Mounting brackets and fasteners (if not already installed):
  - (2) mounting brackets
  - (8) 6-32 flat-head screws
- Rails and fasteners:
  - (2) sliding rail assemblies (left and right)
  - (2) rear hold-down brackets
  - (16) M5 machine screws
  - (8) M5 clip nuts for racks with round holes
  - (8) M5 cage nuts for racks with square holes
  - (8) M6 hex nuts with integrated washers

Parallel system only. Verify that the following items are included with each Powerware Hot Sync CAN Bridge Card:

- CAN Bridge Card cable with (2) RJ-45 connectors
- Redundant signal cable with (2) two-position terminal block connectors
- (2) blue terminating plugs

Rack Setup for the UPS

CAUTION

The UPS is heavy (see page 136). Removing the UPS from its carton requires a minimum of two people. Use the corrugated lifting sling (packaged with the UPS) to move the UPS.

NOTE Mounting rails are required for each individual cabinet.

To install the UPS rail kit:

1. Select the proper holes in the rack for positioning the UPS in the rack (see Figure 46).

NOTE 1 The UPS rails take up position 1 through position 12. The UPS will take up 6U or 18 total hole positions.

NOTE 2 Verify that the hole patterns on the rails and mounting brackets align with the hole pattern on the rack.

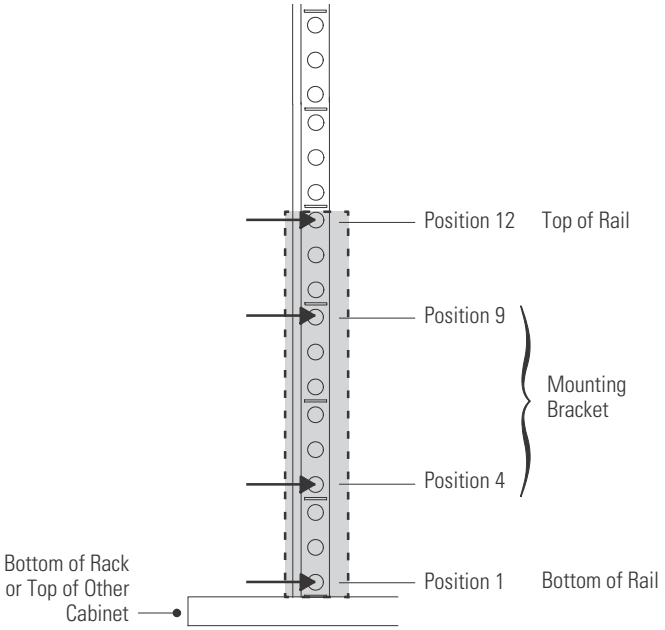


Figure 46. Front Rail Screw Positions for the UPS

2. Pre-assemble four M6 hex nuts to the rail assembly:

   Assemble two of the nuts and the rear hold-down bracket and finger-tighten only. Assemble the other two nuts to the rail and finger-tighten only. See Figure 47.

   Repeat for the other rail.

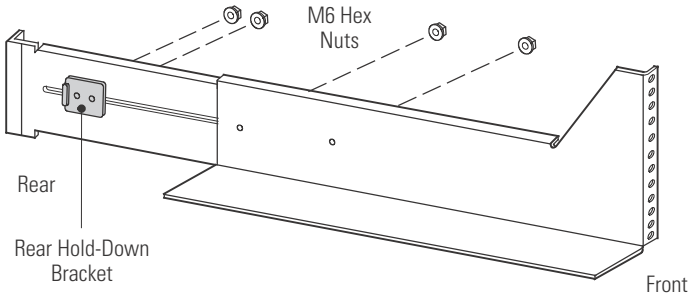


Figure 47. Installing the Rail Hardware (Right Rail Assembly Shown)

NOTE Verify that the holes in the rail align properly with the hole pattern in the rack. If the rack has square holes, verify that the studs on the end of the rail align within the square holes.

3. Using two M5 machine screws, attach the rail to the front of the rack and finger-tighten only (see Figure 46 and Figure 48).

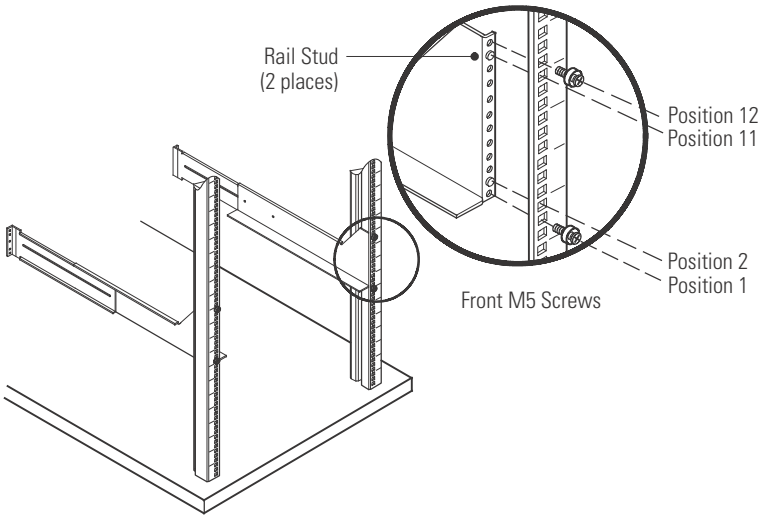


Figure 48. Attaching the Front Rail

4. Adjust the rail size on the rail assembly for the depth of your rack.
5. Secure the rail to the rear of the rack with four M5 machine screws and clip or cage nuts (see Figure 49).

NOTE Verify that the holes in the rail align properly with the hole pattern in the rack. If the rack has square holes, verify that the stud on the end of the rail aligns within the square hole.

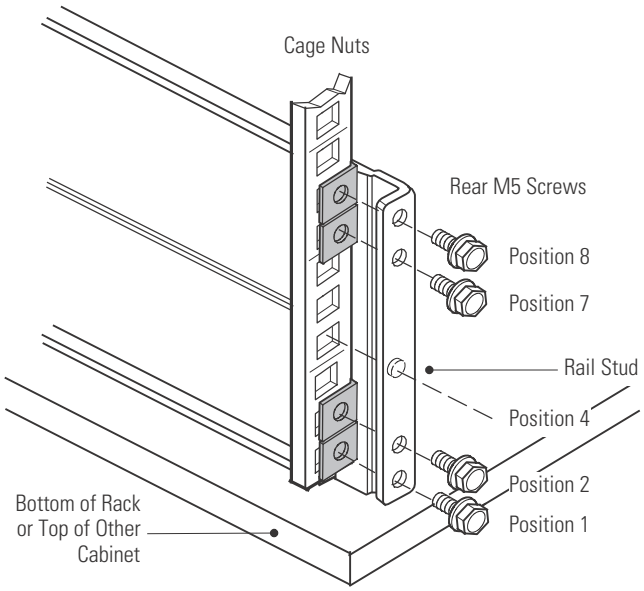


Figure 49. Securing the Rear Rail (Right Rail Assembly Shown)

6. Tighten all screws at the front and rear of the rail, then tighten the rail adjustment screws.

   Leave the screws through the hold-down brackets loose.

7. Repeat Steps 3 through 6 for the other rail.

8. **Parallel system only.** (Optional) Repeat Step 1 through Step 7 to install each rail kit in the parallel system.

NOTE For ease of installation, install all of the rail kits for the parallel system before installing the UPSs.

CAUTION

The UPS is heavy (see page 136). Removing the UPS from its carton requires a minimum of two people. Use the corrugated lifting sling (packaged with the UPS) to move the UPS.

9. Place the UPS on a flat, stable surface with the front of the UPS facing toward you.

10. Remove the electronics module and set it aside (see Figure 50):

    Remove the electronics module locking screw at the top left of the electronics module and retain. Grasp the ring handle at the middle of the module and pull the module slowly out of the cabinet. Pull firmly to unseat the connectors. Use two hands to support the module.

NOTE Treat the electronics module with care to avoid damaging the fans, connectors, or internal circuitry.

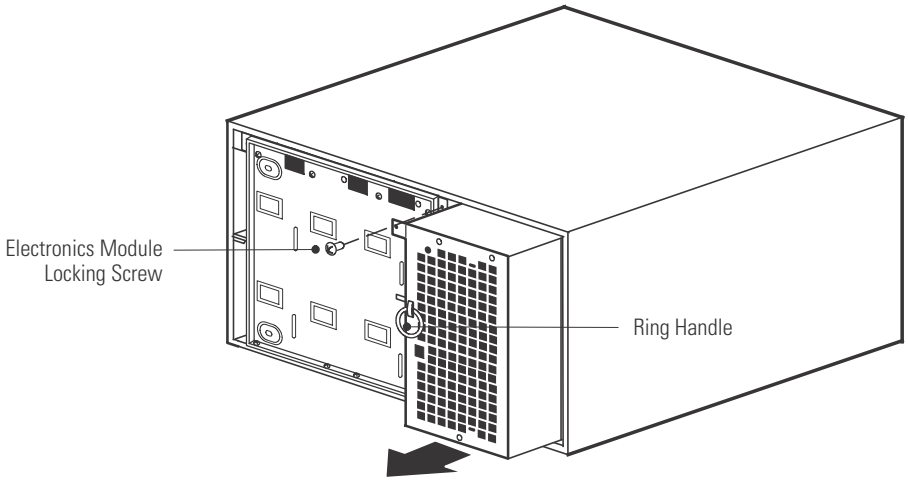


Figure 50. Removing the Electronics Module

11. If the mounting brackets are not already installed, align the two mounting brackets with the screw holes on the sides of the UPS and secure with the supplied 6-32 flat-head screws (see Figure 51).

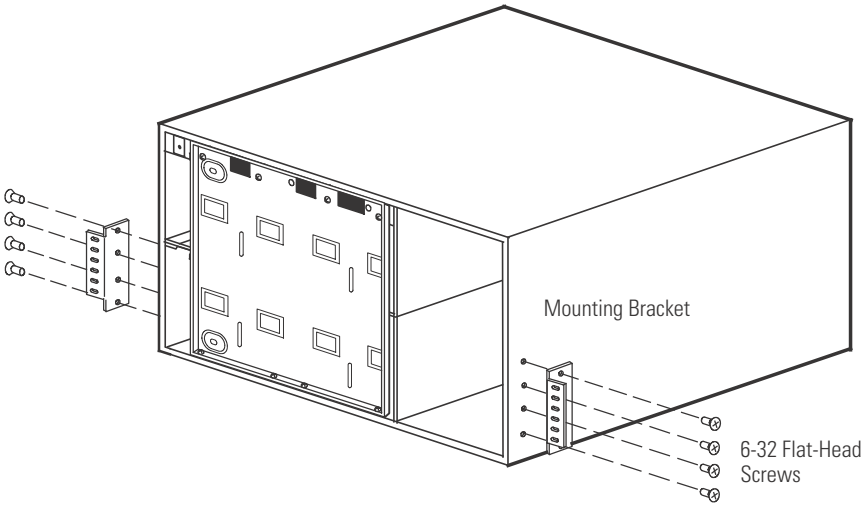


Figure 51. Installing the UPS Mounting Brackets

12. Slide the UPS into the rack.
13. **Parallel or parallel-ready system only.** If you are installing other X-Slot cards besides the Powerware Hot Sync CAN Bridge Card, skip to Step 16.

NOTE Leaving the UPS unattached allows you to adjust the UPS position in the rack for any clearance needed to install the X-Slot cards.

14. Using four M5 machine screws, secure the front of the cabinet to the rack as shown in Figure 52.

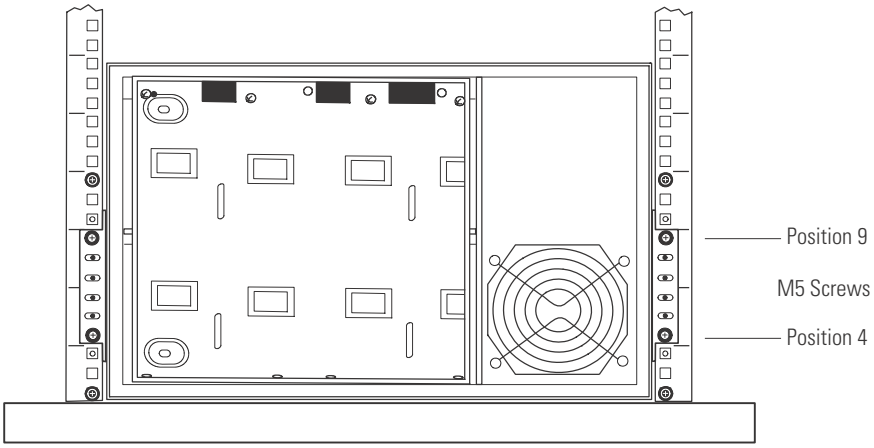


Figure 52. Securing the Front of the UPS

15. Insert the two rear hold-down brackets on the rails into the slots on the rear of the cabinet (see Figure 53).
    a. If necessary, push out on the rack upright to allow the clearance needed to insert the bracket. The rack upright flexes easily.
    b. Verify that the brackets seat firmly, then tighten the nuts on the rear hold-down brackets. The UPS is now secured in the rack.

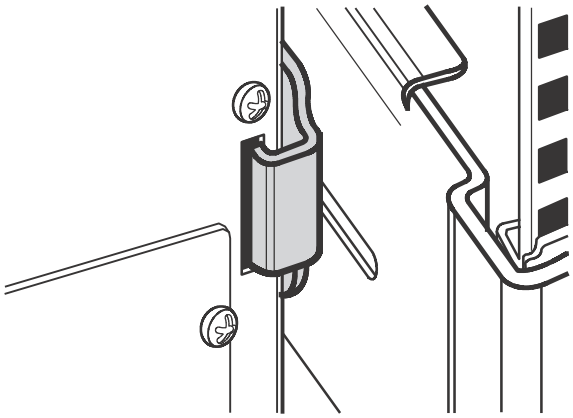


Figure 53. Inserting the Rear Hold-Down Bracket

NOTE Treat the electronics module with care to avoid damaging the fans, connectors, or internal circuitry.

16. Replace the electronics module by sliding it carefully into the cabinet. Push the electronics module firmly to seat the connectors.
17. Reinstall the electronics module locking screw (see Figure 50 on page 67).
18. On the UPS rear panel, plug in the supplied communication terminal block connectors as shown in Figure 54.
19. **Optional but recommended.** Press the two supplied wire saddles into the holes on the rear panel, as shown in During wiring installation, secure any wires to the connectors within the saddles.

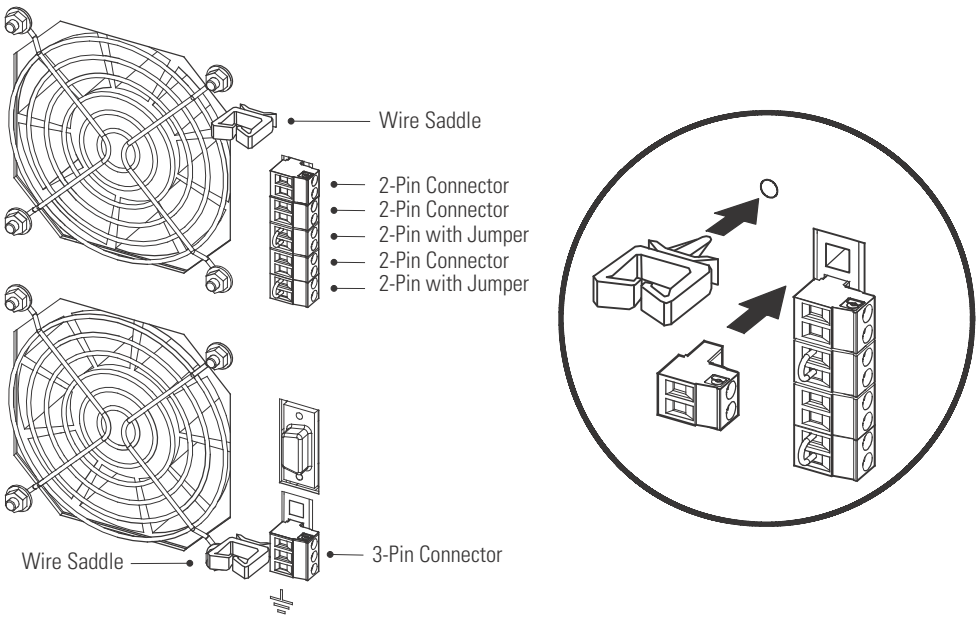


Figure 54. Installing the Communication Terminal Block Connectors

20. Continue to the "Installing the UPS Internal Batteries" section.

Installing the UPS Internal Batteries

⚠ CAUTION

The UPS internal batteries are heavy (see page 136). Each battery tray holds two rows of five batteries. Use caution when handling the heavy battery trays.

To install the battery trays into the UPS cabinet:

1. Verify that the circuit breakers on the UPS rear panel are in the OFF (O) position (see Figure 60 on page 74).
2. Remove the eight screws on the battery cover plate and retain. Remove the plate and retain. See Figure 55.

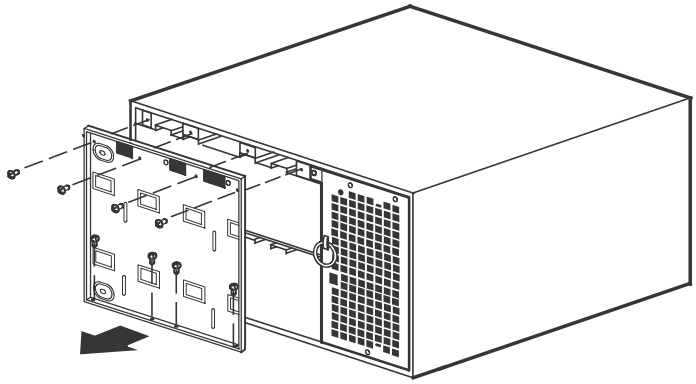


Figure 55. Removing the UPS Battery Cover Plate

3. Slide the battery trays into the cabinet (see Figure 56 for two battery string installations and Figure 57 for single-string installations). Verify that each tray is properly aligned before sliding the tray in.

NOTE When installing single-string battery trays for BladeUPS 5.1 kVA, always install the single-string trays in the bottom battery compartment.

4. When a tray is fully installed, tuck the plastic handle on the end of the tray into place.

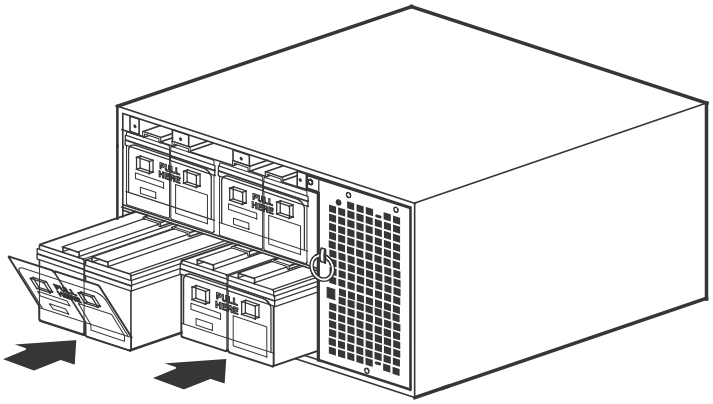


Figure 56. Installing the UPS Battery Trays (Two Battery Strings)

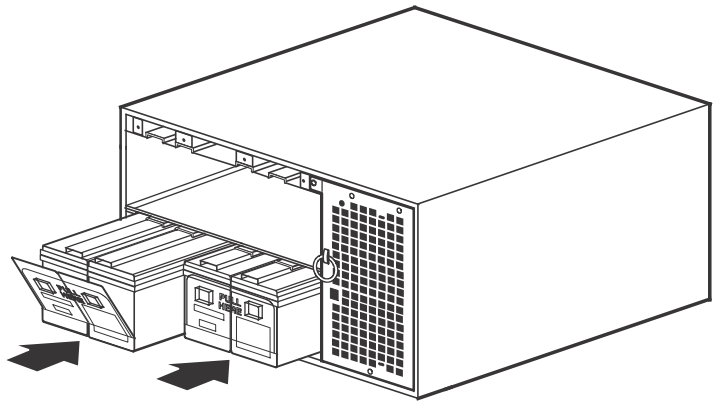


Figure 57. Installing the UPS Single-string Battery Trays for 5.1 kVA BladeUPS

5. Reinstall the battery cover plate.

6. Install the UPS front cover (see Figure 58):

   Plug the LCD cable from the control panel on the front cover into the connector on the electronics module. Use care to loop the LCD cable gently in front of the electronics module.

   Push the top of the front cover firmly into place, and then push the bottom firmly into place.

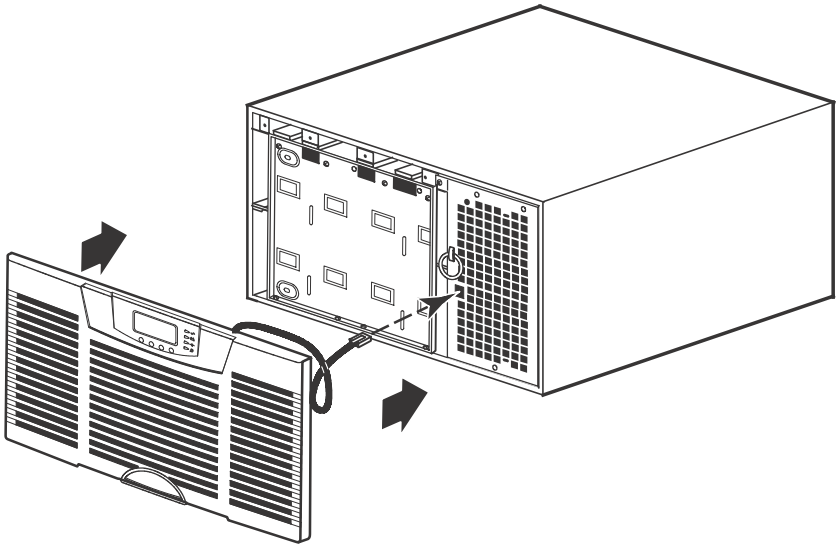


Figure 58. Installing the UPS Front Cover

7. **Parallel system only.** Repeat the steps starting at the beginning of section "UPS Setup" on page 63 for each UPS to be paralleled.

8. If installing optional EBM(s), see "EBM Installation" on page 43.
   Otherwise, continue to "Standalone UPS Installation" on page 72 or "Parallel UPS Installation" on page 75.

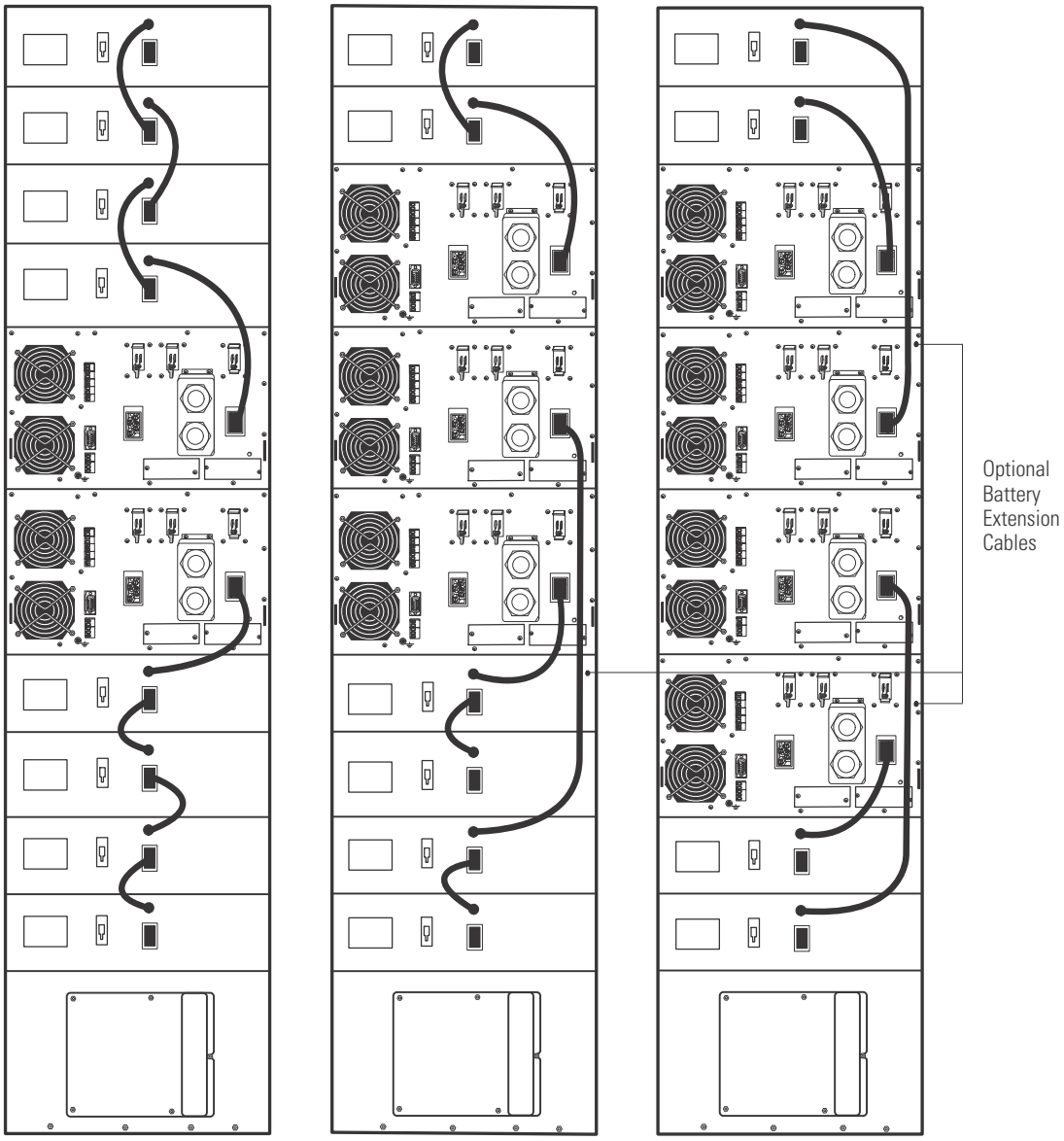


Figure 59. Example EBM Installations in Parallel Systems

Standalone UPS Installation

NOTE Do not make unauthorized changes to the UPS; otherwise, damage may occur to your equipment and void your warranty.

The UPS requires a dedicated branch circuit that meets the following requirements:

- Circuit with overcurrent protection as follows:
  - 50A (BladeUPS 12 model)
  - 30A (BladeUPS 12i or BladeUPS 8 model)
  - 20A (BladeUPS 5.1 model)
- Three-phase, 4-wire plus ground, 208Y/120V nominal (BladeUPS 12 model) with 5-pin IEC309-60 amp receptacle or in-line connector (GH560C9W or similar).
- Three-phase, 4-wire plus ground, 400Y/230V nominal, (380–415 Vac acceptable), (BladeUPS 12i model) with 5-pin IEC309-30 amp receptacle or in-line connector, (GH532C6W or similar)
- 50/60 Hz
- Wall-mounted breaker that is readily accessible to the operator

The BladeUPS models require the following input plug and receptacle (see Table 8):

Table 8. Required Plugs and Receptacles

BladeUPS Model	Input Plug	Receptacle
12i kVA	IEC309-32 (GH532P6W or similar)	GH532C6W (or similar)
12 kVA	IEC309-60 (GH560P9W or similar)	GH560C9W (or similar)
8 kVA	NEMA L21-30P	NEMA L21-30R
5.1 kVA	NEMA L21-20P	NEMA L21-20R

To install the UPS:

1. Switch off utility power to the distribution point where the UPS will be connected. Be absolutely sure there is no power.
2. Verify that all circuit breakers are in the OFF (O) position.

NOTE The load connector breaker controls the load connector only, not the output power cord.

3. If you are installing power management software, connect your computer to the UPS communication port or optional X-Slot card (see "Installing Communication Options and Control Terminals" on page 108). For the communication port, use the supplied serial cable.
4. If your rack has conductors for grounding or bonding of ungrounded metal parts, connect the ground cable (not included) to the ground bonding screw. See Figure 60 for the location of the ground bonding screw.
5. If an emergency power-off (disconnect) switch is required by local codes, see "Remote Emergency Power-off" on page 112 to install the REPO switch before powering on the UPS.
6. Plug in UPS plug into provided utility input receptacle or connector
7. Plug power distribution (RPM or ePDU), into BladeUPS output connector or load connector.
8. Continue to "Standalone UPS Initial Startup" on page 88.

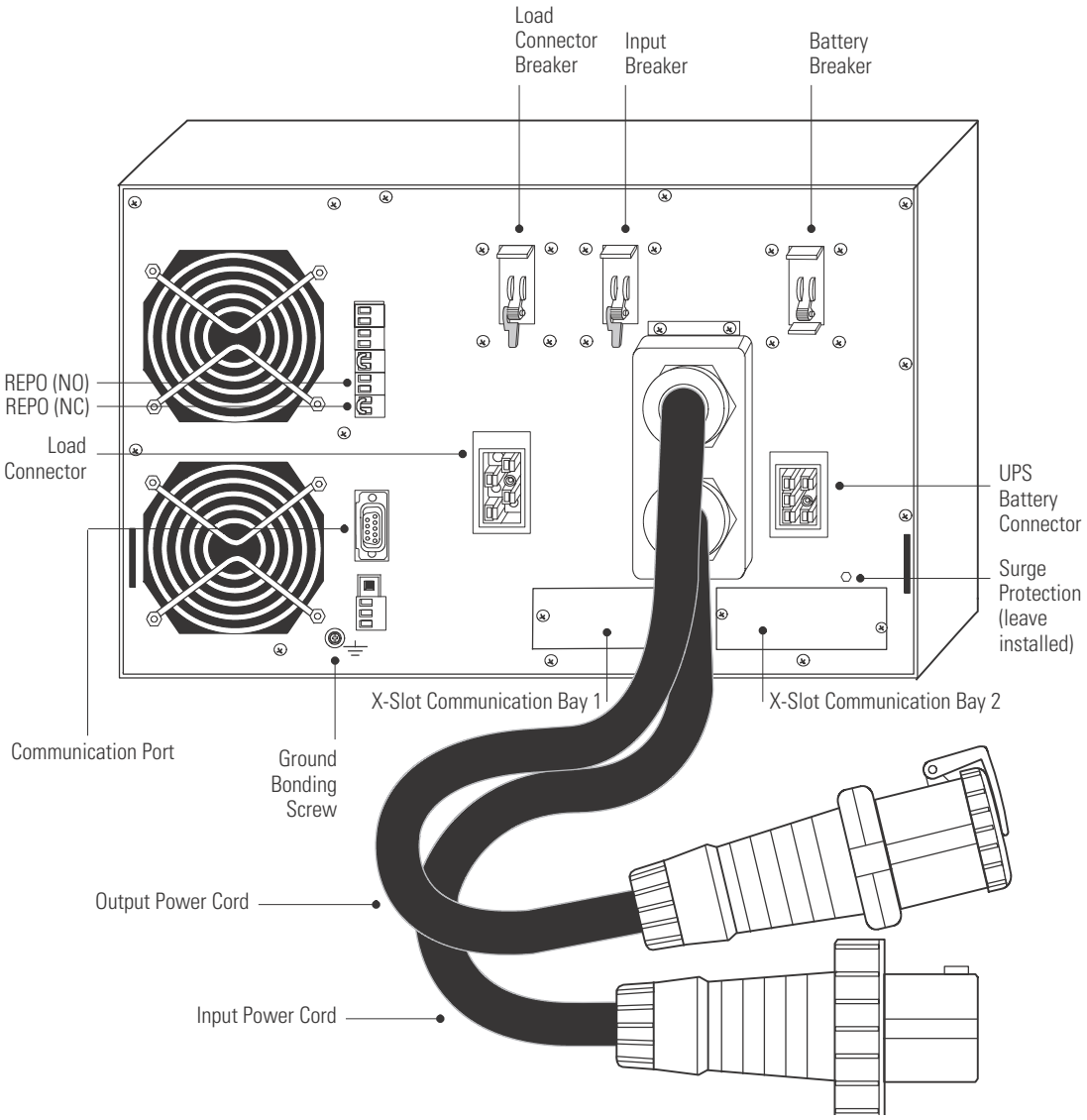


Figure 60. BladeUPS Module Rear Panel (Standalone UPS Shown with IEC 309-60A Output Power Cord)

NOTE The load connector breaker controls the load connector only, not the output power cord.

Parallel UPS Installation

These installation procedures provide the steps to configure the CAN Bridge cards for parallel operation. There are three types of parallel UPS installation. Follow the applicable procedure listed in Table 9 for the type of parallel configuration:

Table 9. Parallel UPS Installation Types

Procedure	Parallel Configuration	Page
New Multiple Parallel UPS Installation	Installing multiple UPSs in a new parallel configuration. In this case, two blue terminating plugs are supplied with each UPS.	75
Single Parallel-Ready UPS Installation	Installing a single UPS in a non-parallel configuration, but intend to install the single UPS into a new parallel configuration later.	81
UPS Installation into an Existing Parallel System	Installing one or more additional UPSs into an existing parallel, or parallel-ready, configuration. In this case, the first UPS may have a black terminating plug in the CAN IN port, or there may be a blue terminating plug in the CAN IN port of the first UPS and a blue terminating plug in the CAN OUT port of the last UPS.	84

NOTE In newer BladeUPS modules, blue plugs replace the Jumper J7s, located on the CAN Bridge cards. Inspect each Powerware Hot Sync CAN Bridge Card to confirm that it does not include a Jumper J7. Remove and discard Jumper J7s.

New Multiple Parallel UPS Installation

CAUTION

Only qualified service personnel (such as a licensed electrician) shall perform the electrical installation. Risk of electrical shock.

NOTE Do not make unauthorized changes to the UPSs; otherwise, damage may occur to your equipment and void your warranty.

To install two to six UPSs in a new parallel configuration:

1. Verify that the UPSs to be paralleled are installed in individual rail kits in a rack containing a BladeUPS Bar.
2. Switch off utility power to the distribution point where the parallel system will be connected. Be absolutely sure there is no power.
3. Verify that all circuit breakers are in the OFF (O) position.

NOTE The load connector breaker controls the load connector only, not the output power cord.

4. Unpack the Powerware Hot Sync CAN Bridge Card and verify that the card was not damaged during shipment (see Figure 61).

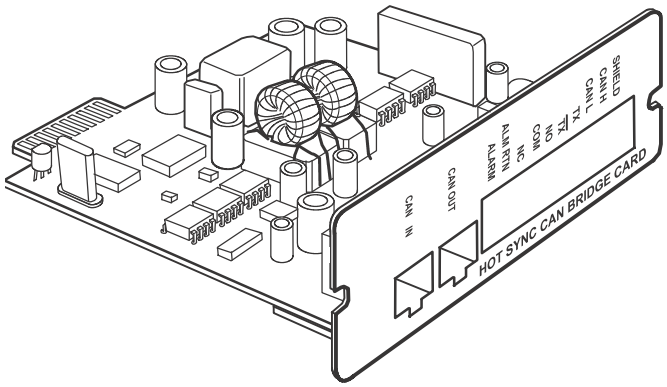


Figure 61. Powerware Hot Sync CAN Bridge Card

5. If there is a Jumper J7 on the Powerware Hot Sync CAN Bridge Card, remove and discard (see Figure 68 on page 86).

NOTE Eaton recommends installing the Powerware Hot Sync CAN Bridge Card in X-Slot Communication Bay 2 (see Figure 60 on page 74), leaving Communication Bay 1 available for other types of X-Slot cards.

6. Remove the X-Slot communication bay cover on the UPS and retain the screws.
7. Install the Powerware Hot Sync CAN Bridge Card into the open X-Slot communication bay #2 on the UPS rear panel. Reinstall screws and tighten.
8. Repeat Step 4 through Step 7 to install a CAN Bridge Card in each UPS to be paralleled.

NOTE The BladeUPS parallel system can automatically assign identities to each UPS in the system based on the order in which their CAN Bridge Cards are wired in Step 9 through Step 12. For more information, see "Auto-Identification" on page 117.

9. Install one of the two supplied blue terminating plugs (see Figure 62) into the CAN IN port on the first UPS (UPS 1 in Figure 64).

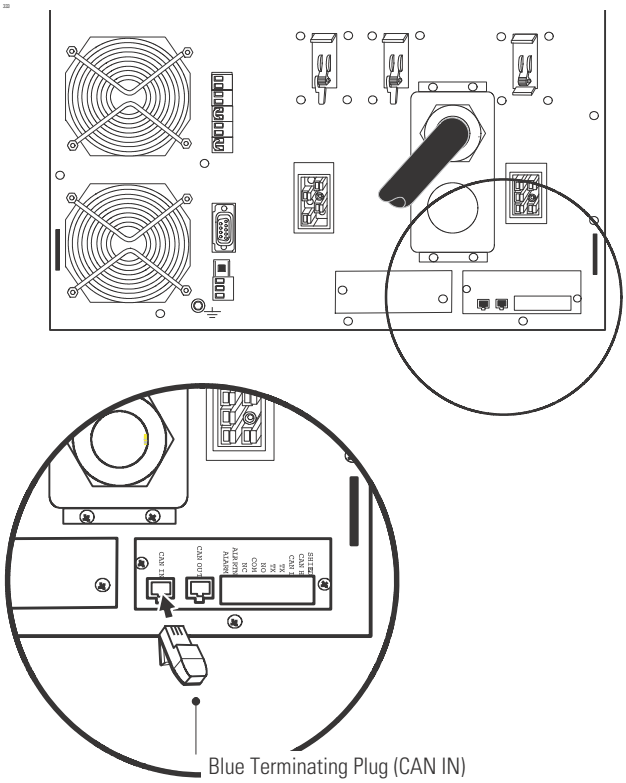


Figure 62. Installing the Blue Terminating Plug (First UPS)

10. Install the second supplied blue terminating plug (see Figure 63) into the CAN OUT port on the last UPS (UPS 3 in Figure 64).

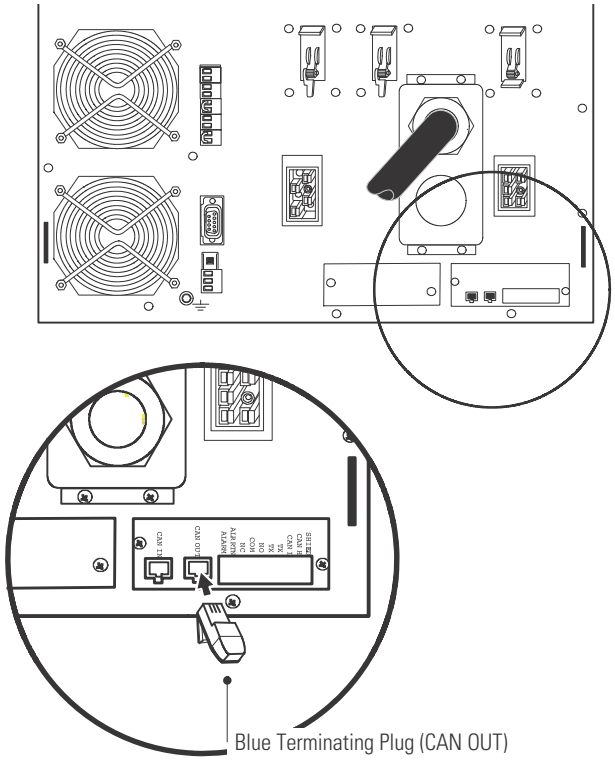


Figure 63. Installing the Blue Terminating Plug (Last UPS)

11. Verify that only the first and last UPSs in the configuration have a blue terminating plug installed.
12. Using the supplied connectors, install a CAN Bridge Card cable between each UPS as shown in Figure 64, connecting the CAN OUT port on one UPS to the CAN IN port on the next UPS.

    On startup, the parallel system will identify the UPS wired after UNIT 1 as UNIT 2, and so forth.

NOTE You can configure the parallel system with UPS 1 at the bottom of the rack (as shown in Figure 64) or at the top of the rack.

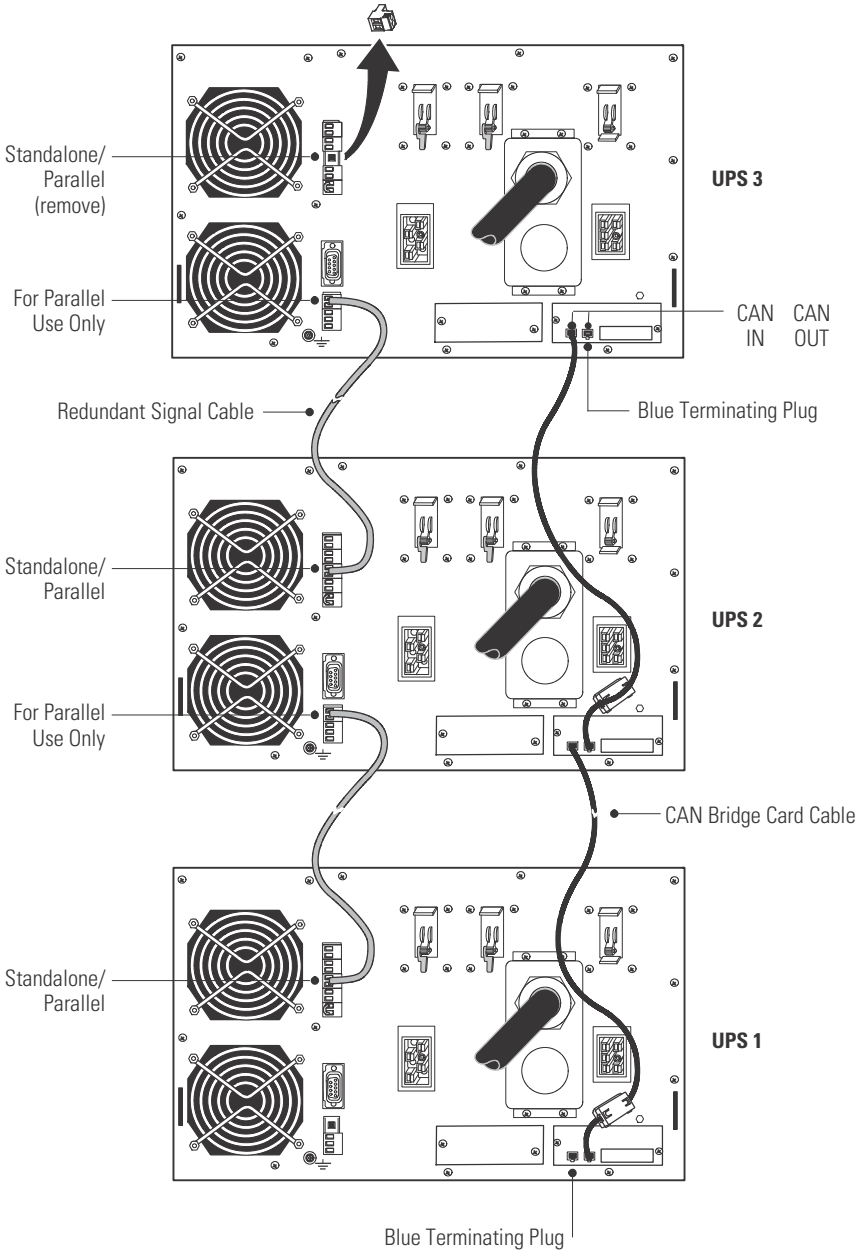


Figure 64. Typical CAN Bridge Card and Redundant Signal Wiring

13. Install a redundant signal cable between the For Parallel Use Only and Standalone/Parallel terminals on each UPS as shown in Figure 64.

    Be sure to check correct polarity when installing the cable.

⚠ CAUTION

If polarity or wiring is not correct, the parallel system does not operate normally. For example, when shutting down one UPS, the remaining UPS transfers the load to bypass instead of supporting the load. Verify that all wiring is correct for proper operation.

14. Remove the Standalone/Parallel terminal block connector from the last UPS (UPS 3 in Figure 64).
15. Tighten the screws securing each Powerware Hot Sync CAN Bridge Card in its X-Slot communication bay.
16. If you are installing power management software, connect your computer to the UPS communication port or optional X-Slot card (see "Installing Communication Options and Control Terminals" on page 108). For the communication port, use the supplied serial cable.

NOTE Installing one Eaton Power Xpert UPS Gateway card allows you to communicate with all UPS modules connected to the same parallel bus configuration.

17. If you left the UPSs unattached to the rack, secure the front and rear of each UPS as described in Step 14 and Step 15 on page 68.
18. If your rack has conductors for grounding or bonding of ungrounded metal parts, connect the ground cable (not included) to the ground bonding screw. See Figure 60 on page 74 for the location of the ground bonding screw.
19. You can install an optional REPO circuit that will shut down the entire parallel system using a single switch. See "Remote Emergency Power-off" on page 112 to install the REPO switch before powering on the parallel system.
20. Connect the parallel input cord from each paralleled UPS, as shown in Figure 65:
    - Loosen the two screws on the plug retainer and slide the plug retainer out.
    - Gently loop and twist the parallel input cord as shown to minimize stress on the cord. The loop and twist for each cord may vary depending on configuration and strain relief to the BladeUPS Bar in the rack.
    - Insert the parallel input cord into the socket. The plug is fully seated when the plug latches snap (top and bottom) into place.

NOTE Make sure the connectors are snapped in tightly to prevent incorrect system operation.

    - Slide the plug retainer back in and tighten the screws.

NOTE The plug retainer prevents the plug from being inadvertently unplugged.

21. Continue to "Parallel System Initial Startup" on page 89.

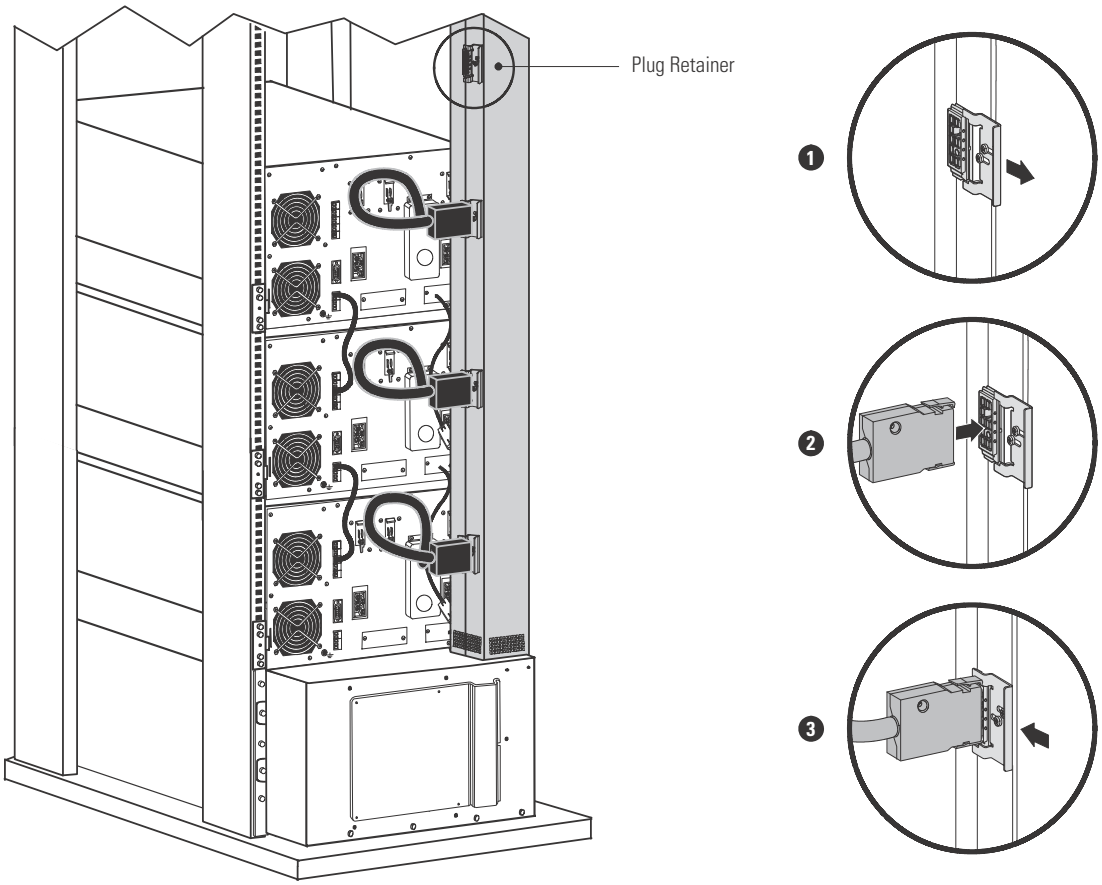


Figure 65. Connecting UPSs to the BladeUPS Bar (Bottom Entry Shown)

Single Parallel-Ready UPS Installation

⚠ CAUTION

Only qualified service personnel (such as a licensed electrician) shall perform the electrical installation. Risk of electrical shock.

NOTE Do not make unauthorized changes to the UPSs; otherwise, damage may occur to your equipment and void your warranty.

To install one UPS in a parallel-ready configuration:

1. Verify that the UPS is installed in a rail kit in a rack containing a BladeUPS Bar.
2. Switch off utility power to the distribution point where the parallel-ready UPS system will be connected. Be absolutely sure there is no power.
3. Verify that all circuit breakers are in the OFF (O) position.

NOTE The load connector breaker controls the load connector only, not the output power cord.

4. Unpack the Powerware Hot Sync CAN Bridge Card and verify that the card was not damaged during shipment (see Figure 61 on page 76).

5. If there is a Jumper J7 on the Powerware Hot Sync CAN Bridge Card, remove and discard (see Figure 68 on page 86).

NOTE Eaton recommends installing the Powerware Hot Sync CAN Bridge Card in X-Slot Communication Bay 2 (see Figure 60 on page 74), leaving the X-Slot Communication Bay 1 available for other types of X-Slot cards.

6. Remove the X-Slot communication bay cover on the UPS and retain the screws.
7. Install the Powerware Hot Sync CAN Bridge Card into the open X-Slot communication bay #2 on the UPS rear panel. Reinstall screws and tighten.
8. Retain both blue terminating plugs for future use.

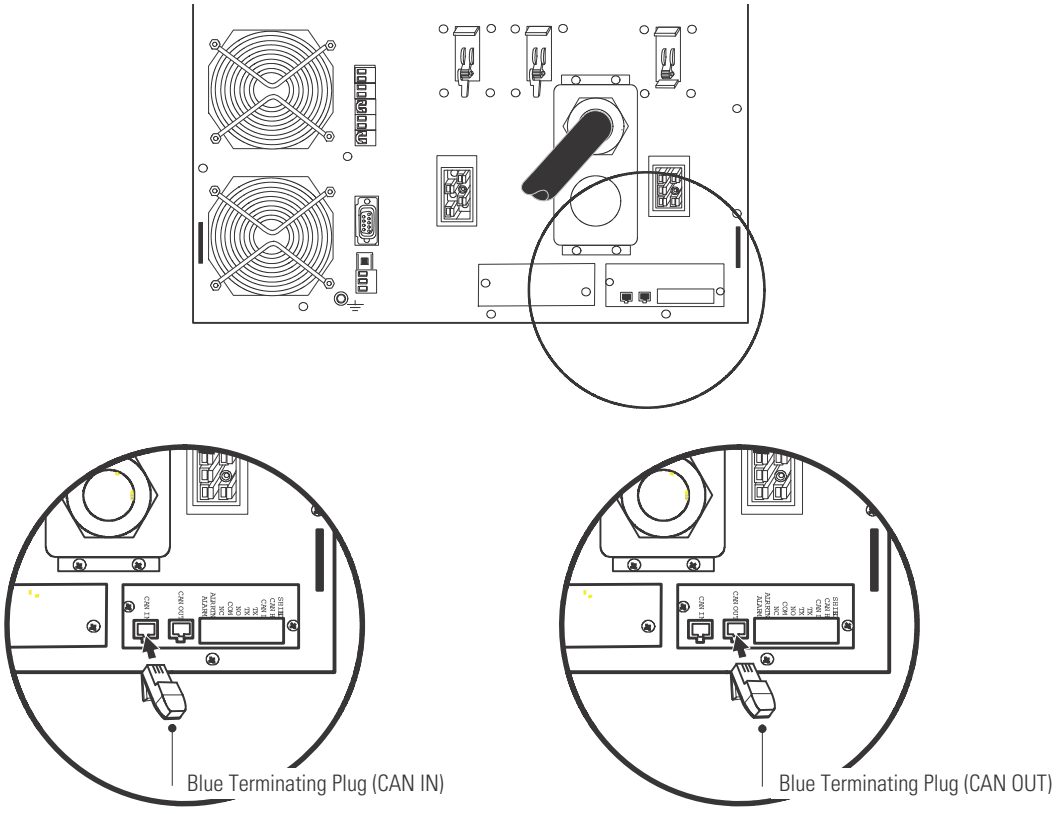


Figure 66. Installing the Blue Terminating Plug (Single Parallel-Ready UPS Installation)

9. Tighten the screws securing the Powerware Hot Sync CAN Bridge Card in its X-Slot communication bay.

NOTE 1 Since there is only one UPS module, retain the redundant signal cable.

NOTE 2 Also retain one of the two pin terminal blocks, which has the small jumper wire, used on the external connection terminal strip.

IMPORTANT

Whenever service is performed and the electronics module needs to be removed, the jumper must be installed on the Standalone/Parallel terminals/pins on the UPS to ensure the internal maintenance bypass works properly.

10. If you are installing power management software, connect your computer to the UPS communication port or optional X-Slot card (see "Installing Communication Options and Control Terminals" on page 108). For the communication port, use the supplied serial cable.
11. If you left the UPS unattached to the rack, secure the front and rear of the UPS as described in Step 14 and Step 15 on page 68.
12. If your rack has conductors for grounding or bonding of ungrounded metal parts, connect the ground cable (not included) to the ground bonding screw. See Figure 60 on page 74 for the location of the ground bonding screw.
13. You can install an optional REPO circuit that will shut down the entire parallel-ready system using a single switch. See "Remote Emergency Power-off" on page 112 to install the REPO switch before powering on the parallel-ready system.
14. Connect the parallel input cord from each paralleled UPS, as shown in Figure 67:
    - Loosen the two screws on the plug retainer and slide the plug retainer out.
    - Gently loop and twist the parallel input cord as shown to minimize stress on the cord. The loop and twist for each cord may vary depending on configuration and strain relief to the BladeUPS Bar in the rack.
    - Insert the parallel input cord into the socket. The plug is fully seated when the plug latches snap into place.

NOTE Make sure the connectors are snapped in tightly to prevent incorrect system operation.

    - Slide the plug retainer back in and tighten the screws.

NOTE The plug retainer prevents the plug from being inadvertently unplugged.

15. Continue to "Parallel System Initial Startup" on page 89.

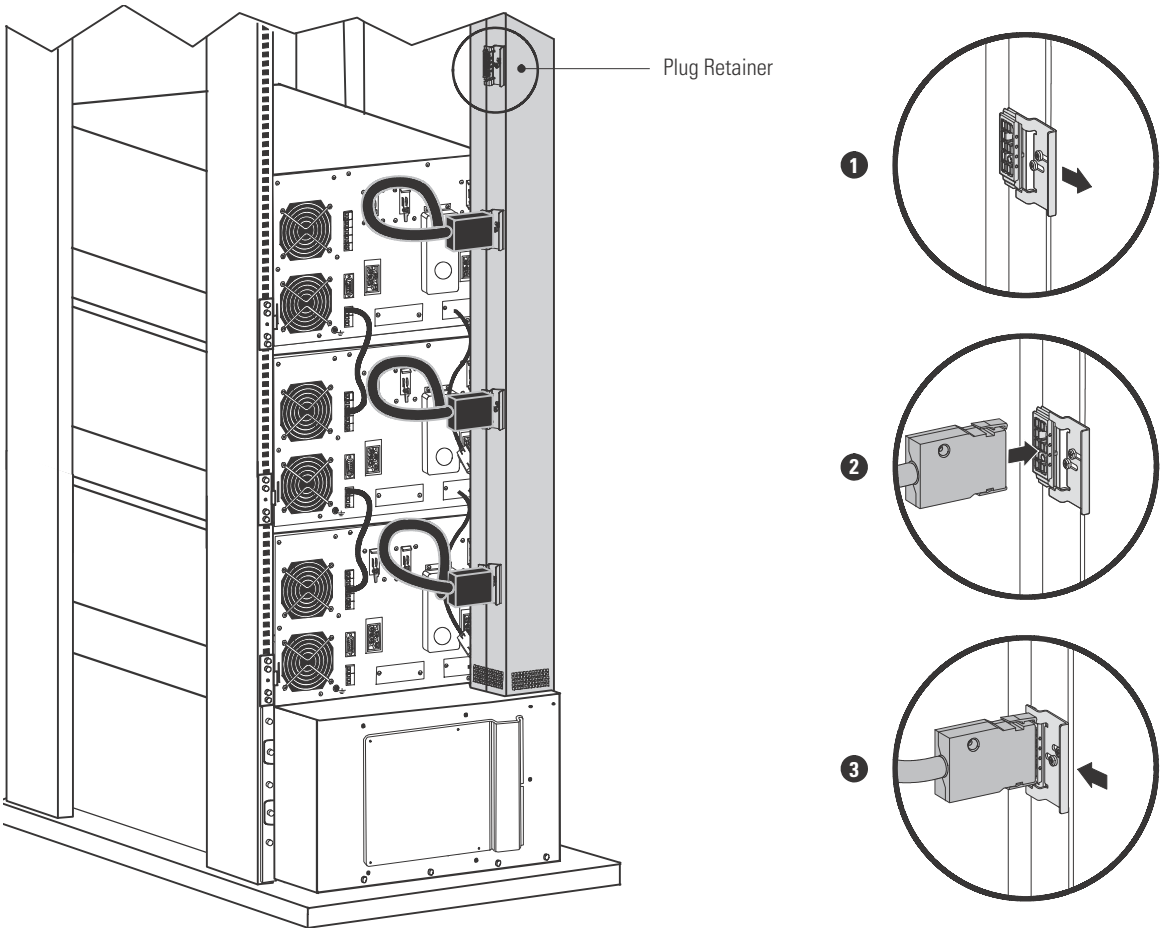


Figure 67. Connecting UPSs to the BladeUPS Bar (Bottom Entry Shown)

UPS Installation into an Existing Parallel System

⚠ CAUTION

Only qualified service personnel (such as a licensed electrician) shall perform the electrical installation. Risk of electrical shock.

NOTE Do not make unauthorized changes to the UPSs; otherwise, damage may occur to your equipment and void your warranty.

Because of the redundant signal cable, UPSs can be installed into an existing system without shutting down the system or disconnecting the load. If you prefer to remove input power to install additional UPSs, see "Parallel System Setup" on page 56.

To install one to five UPSs into an existing parallel (or parallel-ready) configuration:

1. Install individual unit rail kits in the rack containing the BladeUPS Bar, (see Figure 42 on page 59 and see "Rack Setup for the UPS" on page 64, Step 1 through Step 8.
2. For each additional UPS being installed, verify that all circuit breakers are in the OFF (O) position.

NOTE The load connector breaker controls the load connector only, not the output power cord.

3. Unpack the Powerware Hot Sync CAN Bridge Card and verify that the card was not damaged during shipment (see Figure 61 on page 76).

NOTE Eaton recommends installing the Powerware Hot Sync CAN Bridge Card in X-Slot Communication Bay 2 (see Figure 60 on page 74), leaving the X-Slot Communication Bay 1 available for other types of X-Slot cards.

4. Remove the X-Slot communication bay cover on the UPS and retain the screws.
5. Install the Powerware Hot Sync CAN Bridge Card into the open X-Slot communication bay #2 on the UPS rear panel. Reinstall the screws and tighten.
6. Repeat Steps 3 through 5 to install a CAN Bridge Card in each in each new UPS to be installed

NOTE The BladeUPS parallel system can automatically assign identities to each UPS in the system based on the order in which their CAN Bridge Cards are wired in Steps 10 and 11. For more information, see "Auto-Identification" on page 117.

7. Determine the type of PARALLEL SYSTEM configuration you have by examining the ports on the EXISTING Powerware Hot Sync CAN Bridge Cards:
   - Legacy configuration requiring modification of the existing UPSs: The first UPS has a black terminating plug in the CAN IN port. Continue to Step 8.
   - An existing configuration that was installed or modified as a new configuration, requiring no additional modification of the existing UPSs: The first UPS has a blue terminating plug in the CAN IN port and the last UPS has a blue terminating plug in the CAN OUT port. Continue to Step 10.
8. Remove and discard the black terminating plug installed in the CAN IN port of the first UPS.
9. For each existing UPS, remove and discard the Jumper J7 installed in the Powerware Hot Sync CAN Bridge Card:
   a. Remove and retain the screws securing the Powerware Hot Sync CAN Bridge Card to the UPS.
   b. Disconnect the CAN Bridge Card Cable from the Powerware Hot Sync CAN Bridge Card.
   c. Remove the Powerware Hot Sync CAN Bridge Card from the UPS.
   d. Remove and discard the Jumper J7 (see Figure 68).

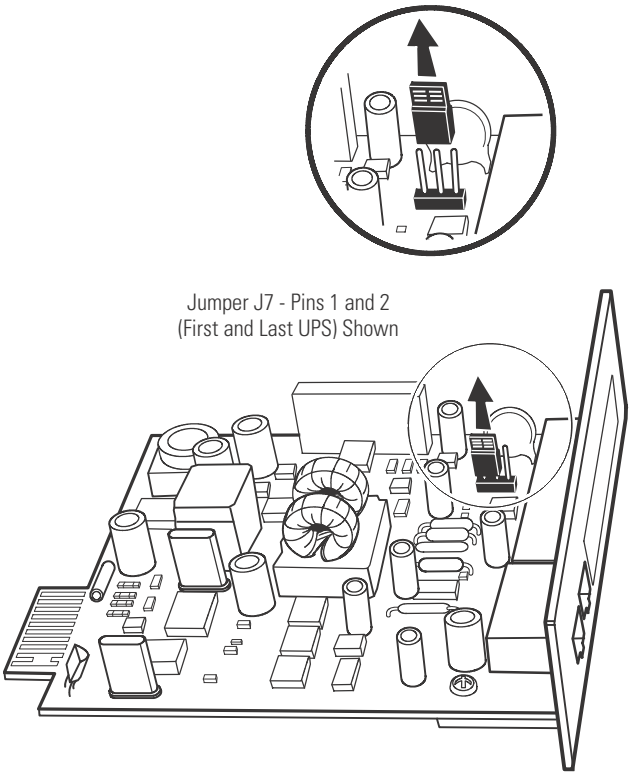


Figure 68. Removing the Jumper J7 (Side View)

e. Reinstall each Powerware Hot Sync CAN Bridge Card in the open X-Slot communication bay #2 on its UPS rear panel.Install screws and tighten.

f. Reconnect the CAN Bridge Card Cable to the Powerware Hot Sync CAN Bridge Card.

10. Verify that a blue terminating plug is installed in the CAN IN port on the first UPS (UPS 1 in Figure 64 on page 79) and a blue terminating plug installed in the CAN OUT port on the last UPS (UPS 3 in Figure 64 on page 79):

    - If you are modifying a legacy configuration, install a blue terminating plug in the CAN IN port on the first UPS. This blue terminating plug replaces the black terminating plug removed from the CAN IN port in Step 8. Also install a blue terminating plug in the CAN OUT port on the last UPS.
    - If you are installing a UPS in an existing, new configuration, verify that a blue terminating plug is installed in the CAN IN port on the first UPS and a blue terminating plug installed in the CAN OUT port on the last UPS. After adding the new UPS, verify that only the first and last UPSs in the configuration have a blue terminating plug installed.

11. Install the BladeUPS modules in the rack by lifting and sliding them into the rack on the rail kits.

12. If not already installed, using the supplied connectors, install a CAN Bridge Card cable between each UPS as shown in Figure 64 on page 79, connecting the CAN OUT port on one UPS to the CAN IN port on the next UPS.

    On startup, the parallel system will identify the UPS wired after UNIT 1 as UNIT 2, and so forth.

NOTE You can configure the parallel system with UPS 1 at the bottom of the rack (as shown in Figure 64 on page 79) or at the top of the rack.

13. For a parallel system not previously shut down, verify that any alarms related to reconfiguring the CAN Bridge Cards have cleared.
14. Install a redundant signal cable between the For Parallel Use Only and Standalone/Parallel terminals on each UPS as shown in Figure 64 on page 79.

    Be sure to check correct polarity when installing the cable.

⚠ CAUTION

If polarity or wiring is not correct, the parallel system does not operate normally. For example, when shutting down one UPS, the remaining UPS transfers the load to bypass instead of supporting the load. Verify that all wiring is correct for proper operation.

15. Remove the Standalone/Parallel terminal block connector from the last UPS (UPS 3 in Figure 64 on page 79).
16. If you left the UPSs unattached to the rack, secure the front and rear of each UPS as described in Step 14 and Step 15 on page 68.
17. If your rack has conductors for grounding or bonding of ungrounded metal parts, connect the ground cable (not included) to the ground bonding screw. See Figure 60 on page 74 for the location of the ground bonding screw.
18. You can install an optional REPO circuit that will shut down the entire parallel system using a single switch. See "Remote Emergency Power-off" on page 112 to install the REPO switch before powering on the parallel system.
19. Connect the parallel input cord from each paralleled UPS as shown in Figure 67 on page 84:
    - Loosen the two screws on the plug retainer and slide the plug retainer out.
    - Gently loop and twist the parallel input cords as shown to minimize stress on the cords. The loop and twist for each cord may vary depending on configuration and strain relief to the BladeUPS Bar in the rack.
    - Insert the parallel input cord into the socket. The plug is fully seated when the plug latches snap into place.
    - Slide the plug retainer back in and tighten the screws.

NOTE The plug retainer prevents the plug from being inadvertently unplugged.

20. If the BladeUPS system was shut down to add the new modules, continue to "Parallel System Initial Startup" on page 89. If the BladeUPS system remained operational, continue with Step 21.
21. Switch the new UPS input circuit breaker to the ON (|) position.
22. Wait for the UPS front panel display to illuminate. The ⚠ indicator flashes on the UPS.
23. Check the UPS front panel display for active alarms or notices (other than "Batteries Disconnected"). Resolve any active alarms before continuing. See "Service and Troubleshooting" on page 131.
24. Switch the UPS battery circuit breaker to the ON (|) position.
25. If optional EBMs are installed, switch all EBM battery circuit breakers to the ON (|) position.
26. Verify that the "Batteries Disconnected" alarm has cleared. Verify that no other alarms appear on the UPS front panel display.

27. Press any button on the front panel display to activate the menu options, and then press the button until the TURN UPS ON/OFF menu displays.
28. Press the → button to display the TURN UPS ON option; press the ↵ button.
29. Confirm the selection. Press and hold the ↵ button for three seconds, until the UPS stops beeping.
    a. Verify that the ~ indicator illuminates solid, indicating that the UPS is operating normally and is in parallel with all other BladeUPS modules in the system.
    b. If the indicator is flashing, do not proceed until all alarms are clear. Check the UPS status from the front panel to view the active alarms. Correct the alarms and restart if necessary.
30. If loads are to be connected to the load connector receptacle, connect the loads before turning on the load connector breaker.
31. Press the ESC button until the Start screen appears.
32. If optional EBMs are installed, see to set the number of installed EBMs.
33. To change any other factory-set defaults, see "Operation" on page 93.
34. If connecting to a REPO circuit, use procedure on pages 110 thru 112. Use caution while connecting the REPO as to not EPO operating systems.

Standalone UPS Initial Startup

To start up a standalone UPS:

NOTE Verify that the total equipment ratings do not exceed the UPS capacity to prevent an overload alarm.

1. Plug the equipment to be protected into the UPS, but do not turn on the protected equipment (see Figure 60 on page 74).
2. Make any necessary provisions for cord retention and strain relief.
3. Verify that all UPS circuit breakers are in the OFF (O) position.

NOTE The load connector breaker controls the load connector only, not the output power cord.

4. Verify that the UPS power cord is plugged in.
5. Switch on utility power where the UPS is connected.
6. Remove the breaker ties from the circuit breakers.
7. Switch the UPS input circuit breaker to the ON (|) position.
8. Wait for the UPS front panel display to illuminate.

   The 🔔 indicator flashes on the UPS.
9. Check the UPS front panel display for active alarms or notices (other than "Batteries Disconnected"). Resolve any active alarms before continuing. See "Service and Troubleshooting" on page 131.
10. Switch the UPS battery circuit breaker to the ON (|) position.
11. If optional EBMs are installed, switch all EBM battery circuit breakers to the ON (|) position.

12. Verify that the "Batteries Disconnected" alarm has cleared. Verify that no other alarms appear on the UPS front panel display.

    If the ⚠ indicator is flashing, do not proceed until all alarms are clear. Check the UPS status from the front panel to view the active alarms. Correct the alarms and restart if necessary.

13. Press any button on the front panel display to activate the menu options, and then press the button until the TURN UPS ON/OFF menu displays.

14. Press the → button to display the TURN UPS ON option; press the ↵ button.

15. Confirm the selection. Press and hold the ↵ button for three seconds, until the UPS stops beeping.

    Verify that the ⏻ indicator illuminates solid, indicating that the UPS is operating normally and any loads not connected through the load connector are now energized.

    If the ⚠ indicator is flashing, do not proceed until all alarms are clear. Check the UPS status from the front panel to view the active alarms. Correct the alarms and restart if necessary.

    The UPS should be in Normal mode. By default, Normal mode operates on the High Efficiency setting (see "Normal Mode" on page 97).

16. To energize a load connected through the load connector, switch the load connector circuit breaker to the ON (|) position.

17. Press the ESC button until the Start screen appears.

18. If optional EBMs are installed, see "Configuring the UPS for EBMs" on page 103 to set the number of installed EBMs.

19. To change any other factory-set defaults, see "Operation" on page 93.

NOTE Eaton recommends setting the Date and Time and the Start screen.

20. If you installed an optional REPO, test the REPO function:

    Activate the external REPO switch. Verify the status change on the UPS display.

    Deactivate the external REPO switch and restart the UPS.

21. See "Updating the UPS Firmware" on page 129.

NOTE The batteries charge to 80% capacity in less than 5 hours. However, Eaton recommends that the batteries charge for 48 hours after installation or long-term storage.

Parallel System Initial Startup

To start up a parallel (or parallel-ready) system:

NOTE Verify that the total equipment ratings do not exceed the parallel system capacity to prevent an overload alarm.

1. Verify that all UPS circuit breakers are in the OFF (O) position.

NOTE The load connector breaker controls the load connector only, not the output power cord.

2. Switch on utility power where the UPS is connected.
3. Remove the breaker ties from the circuit breakers.
4. Switch the UPS input circuit breaker on each UPS to the ON (|) position.
5. Wait for the front panel display on each UPS to illuminate.

   The ⚠ indicator flashes on each UPS.
6. Check each UPS front panel display for active alarms or notices (other than "Batteries Disconnected"). Resolve any active alarms before continuing. See "Service and Troubleshooting" on page 131.
7. Switch all UPS battery circuit breakers to the ON (|) position.
8. If optional EBMs are installed, switch all EBM battery circuit breakers to the ON (|) position.
9. Verify that the "Batteries Disconnected" alarm on each UPS has cleared. Verify that no other alarms appear on any UPS front panel display.

   If an ⚠ indicator is flashing on any UPS, do not proceed until all alarms are clear. Check the UPS status from the front panel to view the active alarms. Correct the alarms and restart if necessary.
10. On any UPS, press any button on the front panel display to activate the menu options, and then press the button until the TURN UPS ON/OFF menu displays.
11. Press the → button to display the TURN SYSTEM ON option; press the ↵ button.
12. Confirm the selection. Press and hold the ↵ button for three seconds, until the UPS stops beeping.

    Verify that the ⏻ indicator illuminates solid on each UPS, indicating that the UPS is operating normally and any loads not connected through the load connector are now energized.

    If the ⚠ indicator on any UPS is flashing, do not proceed until all alarms are clear. Check the UPS status from the front panel to view the active alarms. Correct the alarms and restart if necessary.

NOTE For a parallel-ready system (a single UPS installed to be part of a future parallel system), set the Parallel Operation Settings / Parallel Operation Mode to "Capacity Mode" to prevent unnecessary alarms (see Table 12 on page 95, Parallel Operation Settings).

Each UPS should be in Normal mode. By default, Normal mode operates on the High Efficiency setting (see "Normal Mode" on page 97).

13. To energize loads connected through the load connectors, switch all load connector circuit breakers to the ON (|) position.
14. On any UPS, press the ESC button until the Start screen appears.
15. Verify that all UPSs in the parallel system are updated to the same firmware version.

NOTE Firmware v2.0 and higher does not operate in a parallel system with v1.xx. All UPSs must have firmware v2.x installed.

On each UPS, press any button on the front panel display to activate the menu options, and then press the button until the IDENTIFICATION menu displays. Press the ↵ button to display the identification data, including the firmware version.

If any firmware versions do not match, install the firmware from the supplied BladeUPS: Documents, Firmware, and Installation Video CD or visit **www.eaton.com/powerquality** to download the latest version and the instructions for installing it.

16. If optional EBMs are installed, see "Configuring the UPS for EBMs" on page 103 to set the number of installed EBMs for each UPS.
17. To change any other factory-set defaults, see "Operation" on page 93.

NOTE 1 Eaton recommends setting the Date and Time and the Start screen.

NOTE 2 Verify that the Parallel Operation Settings are set appropriately for your system. For example, if you know the load will exceed the redundancy level of the system, set the Parallel Operation Settings / Parallel Operation Mode to "Capacity Mode" to prevent unnecessary alarms (see Table 12 on page 95, Parallel Operation Settings).

18. If you installed an optional REPO, test the REPO function:

    Activate the external REPO switch. Verify the status change on the UPS display.

    Deactivate the external REPO switch and restart the UPS.
19. See "Updating the UPS Firmware" on page 129.

NOTE 1 When adding a new UPS to a parallel system or updating one UPS's firmware, verify that all UPSs in the parallel system are updated to the same firmware version.

NOTE 2 The batteries charge to 80% capacity in less than 5 hours. However, Eaton recommends that the batteries charge for 48 hours after installation or if the UPS is shut off from more than 30 days.

Chapter 5 Operation

This chapter contains information for operating the BladeUPS module, including:

- Control panel operation
- Operating modes
- UPS startup and shutdown
- Transferring the UPS between modes
- Setting the power strategy
- Configuring the UPS for battery settings

Control Panel Functions

The UPS has a four-button graphical LCD with backlight. It provides UPS load status, events, measurements, current settings, and other useful information (see Figure 69).

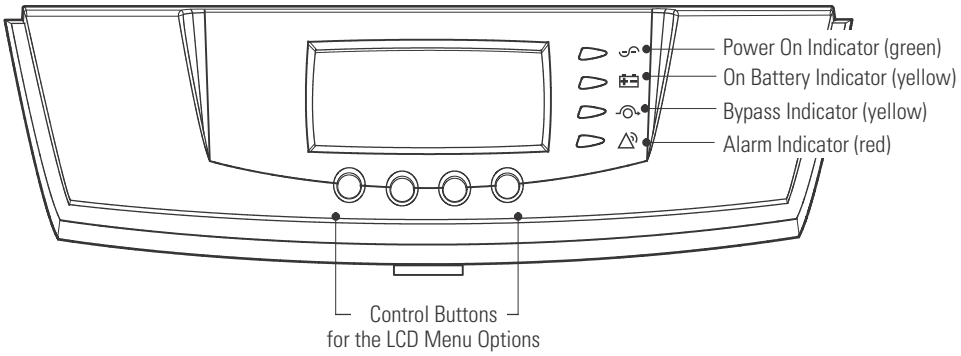


Figure 69. BladeUPS Module Control Panel

The Mimic screen shows the internal components of the UPS and a real-time display of the operating status (see Figure 70). A thicker bar indicates the node is energized.

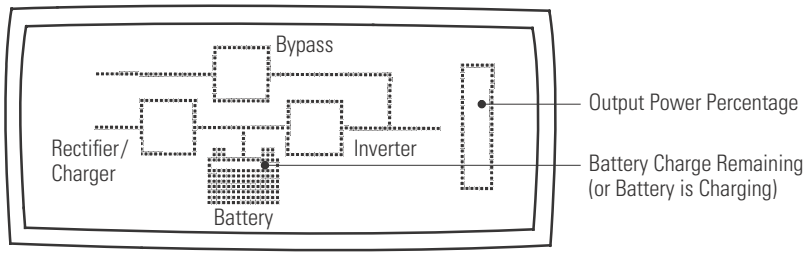


Figure 70. BladeUPS Module Mimic Screen

Table 10 shows the indicator icons and provides indicator status and descriptions.

Table 10. Indicator and Status Description

Indicator	Status	Description
UPS OPERATION MODE Green	On	The UPS is operating normally.
	Flashing	• The UPS is starting up or is shut down and waiting for power to return. • A new information message is active. • Bypass is not available.
	Off	The UPS is turned off and will not turn on automatically.
BATTERY MODE Yellow	On	The UPS is in Battery mode.
BYPASS MODE Yellow	On	The UPS is in Bypass mode.
ACTIVE ALARM MODE Red	On	The UPS has an active alarm.
	Flashing	There is a new UPS alarm condition. See “Troubleshooting” on page 135 for additional information.

Changing the Language

Press and hold the first button on the left for approximately five seconds to select the language menu. This action is possible from any LCD menu screen.

Display Functions

The LCD displays the Start screen at startup. During operation, the Start screen also displays after 15 minutes of inactivity. The display is user-selectable: the default is the Eaton logo, but this can be changed to the Mimic screen in the User Settings menu.

The backlit LCD automatically dims after a long period of inactivity. Press any button to restore the screen.

Press any button to activate the menu options. Use the two middle buttons (and ↓) to scroll through the menu structure. Press the → button to enter a submenu. Press the ↵ button to select an option. Press the ESC button to cancel or return to the previous menu.

Table 11 shows the basic menu structure.

NOTE Menu functions related to parallel systems appear only on paralleled UPSs.

Table 11. Menu Map for Display Functions

Main Menu	Submenu	Display Information or Menu Function
UPS Status		System Normal | High Efficiency Power: % / Battery Resting | Battery Floating UPS in Parallel Mode / Parallel Unit Number x / Units on CAN Bus / Units on Load
Event Log		Displays up to 100 events and alarms
Measurements For more information about measurements, see "Metering" on page 118.	Parallel System	kW [by unit] / kW [Parallel total]
	Output	Voltage L-N and L-L / Current / Frequency / Power kW / Power kVA / Power pf
	Battery	Voltage / Current / Runtime
	Input	Voltage L-N and L-L / Current / Frequency
	Load Receptacle	Outlet Voltage / Outlet Current / Outlet Power kW / Outlet Power kVA / Outlet Frequency
Control	Go to Bypass Mode	Transfers the UPS system to internal Bypass mode When this command is active, the option changes to Go to Normal Mode.
	Start Battery Test	Schedules a battery test. The battery test may not start immediately.
	Display Test	Four different selectable tests for the front panel functions: the LEDs cycle through, the alarm beep sounds, the backlight turns off and on, and the pixels scroll through to test the LCD.
Settings	User Settings	Options for user-defined settings (see Table 14 for details).
	Service Settings	Not available.
Identification		Type / Part Number / Serial Number / Firmware / Display / System Display / CAN Bridge
Turn UPS On/Off	On and Off Options	Turn UPS Off / Turn System On / Turn System Off

User Settings

Table 12 displays the options that you can change.

Table 12. User Settings

Description	Available Settings	Default Setting
Set Date and Time	Set Year, Month, Day Date: mm/dd/yyyy Set Hours, Minutes Time is a 24-hour clock.	 01/01/2003 00:00
Display Contrast	Adjust contrast with up/down arrow buttons.	Moderate
Change Language	Select Language Available languages depend on model and languages installed.	English
Relay Config	Relay: [Alarm-1] [X-Slot 1-1/2/3/4] or [X-Slot 2-1/2/3/4] Setup: [On Battery] [Summary Alarm] [On Bypass] [UPS OK] [custom] [empty]	Alarm 1: empty X-Slots (1 or 2) #1: UPS OK #2: On Bypass #3: Summary Alarm #4: On Battery
Signal Inputs	Signal: [X-Slot-1] [X-Slot-2] [INPUT 1] [INPUT 2] [signal inputs] Logic: [0] [1] For more information, see "Programmable Signal Inputs" on page 111.	<empty> [1]

Table 12. User Settings (Continued)

Description	Available Settings	Default Setting
Serial Port Config	Port: [X-Slot-1] [X-Slot-2/Serv] Speed: [19200] [9600] [2400] [1200]	19200
Parallel Operation Settings	Parallel Operation Mode: [Redundant Mode] [Capacity Mode] This setting is not available for six-unit systems (must be Redundant Mode only).	Redundant Mode
	Parallel XCP: [System] [Sub Unit] Select Sub Unit for PowerVision® software. Select System for other software.	System
	Auto ID Restart: [Done] [Restart] Select Restart to reinitialize auto identification (see "Auto-Identification" on page 117).	None
Battery Setup	Number of EBMs: [0 through 4] (See "Configuring the UPS for EBMs" on page 104.)	0 (means internal batteries only)
	Battery Low Alarm Level: [1.750 through 1.950 volts per cell] (See "Setting the Battery Low Alarm Level" on page 104.)	1.880 V/cell (provides approximately 2.5 min warning for the UPS)
	Automatic Battery Tests: [Enabled] [Disabled] (See "Running Automatic Battery Tests" on page 105.)	Enabled (automatically runs the battery test once a month)
	External Battery Capacity: Set Watts per cell (See "Configuring the UPS for Customer-Supplied External Batteries" on page 103.) Use this setting only with customer-supplied external batteries and the External Battery Interconnect.	None
Power Strategy	[High Efficiency] [Standard] For more information, see the following section, "Operating Modes" on page 97.	High Efficiency
Start Screen	Eaton logo Mimic screen (see Figure 70 on page 93)	Eaton logo
User Password	[Enabled] [Disabled] If Enabled is selected, the password is USER.	Disabled
Audible Alarms	[Normal Sound] [Disabled]	Normal Sound
Unsynchronized Transfer to Bypass	[Allowed] [Not Allowed]	Not Allowed
Transfer to Bypass When Overload	[After a delay] [Immediately]	After a delay
Automatic Start Delay	-1 through 32767 seconds (-1 means disabled)	0s
Control Commands from X-Slot1 Control Commands from X-Slot2/Serv	[Allowed] [Disabled] Selecting Disabled prevents load commands such as Load Off through the X-Slot, including remotely.	Allowed
X-Slot Signal Input Activation Delay	0 through 65 seconds	5s
Site Wiring Fault Notice	[Enabled] [Disabled]	Alarm Enabled
Input Range	[Standard] [ITIC}	Standard

Table 12. User Settings (Continued)

Description	Available Settings	Default Setting
Reset Custom Event Settings	0 through 32	Total: 0/32
REPO Configuration	[Enabled][Disabled]	Enabled
SEE NOTE Delayed Rectifier Startup Settings	Group number: 0 through 10 (integers only);	0 (Zero disables this feature)
	Delay in seconds: 2 through 5 sec (integers only)	5

NOTE Delayed rectifier startup increases existing delays for utility outages. This will allow a maximum of 50 seconds of additional delay before starting the Rectifier and thus transferring the load to the rectifier feed.

When the group number is changed, the delay is determined by (Group #) * (Delay Value) = Delay in seconds. An RT unit would return the load to utility after the delay. After the delay, a parallel unit would have the lowest unit ID return to utility and subsequent units would return using a brief delay. The group and delay settings will be synchronized across all parallel units

Operating Modes

The BladeUPS module front panel indicates the UPS status through the UPS indicators (see Figure 69 on page 93).

Normal Mode

During Normal mode, the indicator illuminates solid and the utility powers the UPS. The UPS monitors and charges the batteries as needed and provides filtered power protection to your equipment.

Two settings are available for Normal Mode:

- **High Efficiency.** Double-conversion on demand.
- **Standard.** Continuous double-conversion.

By default, the UPS operates on a High Efficiency setting that minimizes heat contribution to the rack environment. The system bypass input directly supplies the system output with three-phase AC power, and the UPS stands ready to automatically transfer to double-conversion (Standard) operation as needed. The battery recharges when necessary.

If the input line exceeds normal operating range, the UPS transfers to Standard operation to produce a regulated output voltage. When the input line returns to normal operating range, the UPS returns to High Efficiency operation.

You can change the default High Efficiency setting to Standard from the User Setting menu (see Table 14 on page 104).

BladeUPS 12 model only. Standard operation (continuous double-conversion) is available only for loads less than 10 kW (85%). If the load exceeds the 10 kW limit while on Standard operation, the UPS will switch back to High Efficiency operation until the load is reduced below 9 kW. After three attempts within one hour to operate on Standard, the UPS will lock back into High Efficiency operation for one hour to prevent continuous cycling.

Battery Mode

When the UPS is operating during a power outage, the alarm beeps once every five seconds and the indicator illuminates solid.

When the utility power returns, the UPS transfers to Normal mode operation while the battery recharges.

If battery capacity becomes low while in Battery mode, the indicator flashes slowly and the audible alarm becomes continuous. If the Battery Low alarm is set, the indicator also illuminates solid. This warning is approximate, and the actual time to shutdown may vary significantly.

NOTE Depending on the UPS load and the number of Extended Battery Modules (EBMs), the Battery Low warning may occur before the batteries reach 25% capacity. See Table 28 on page 138 for estimated runtimes.

When utility power is restored after the UPS shuts down, the UPS automatically restarts. UPSs in a parallel system stagger their return from Battery mode by 500 ms, beginning with UNIT 1.

Bypass Mode

In the event of a UPS overload or internal failure, the UPS transfers your equipment to utility power. Battery mode is not available and your equipment is not protected; however, the utility power continues to be filtered passively by the UPS. The indicator illuminates.

The UPS transfers to Bypass mode when:

- The user activates Bypass mode through the front panel.
- The UPS detects the control panel being disconnected from the electronics module.
- The UPS detects the electronics module being replaced.
- The UPS detects an internal failure.
- The UPS has an overtemperature condition.
- The UPS has an overload condition.
- The UPS detects a "request" or "force" to bypass from an external maintenance bypass switch.

Standby Mode

When the UPS is turned off and remains plugged into a power outlet, the UPS is in Standby mode. The indicator is off, indicating that power is not available to your equipment. The battery recharges when necessary.

UPS Startup and Shutdown

To start up or shut down a UPS, see:

- "Starting a Standalone UPS" on page 98
- "Starting a Parallel System" on page 99
- "Starting the UPS on Internal Bypass" on page 100
- "Standalone UPS Shutdown" on page 101
- "Individual Paralleled UPS Shutdown" on page 101
- "Parallel System Shutdown" on page 102

Starting a Standalone UPS

To start a standalone UPS (see Figure 60 on page 74):

1. Verify that all UPS circuit breakers are in the OFF (O) position.

NOTE The load connector breaker controls the load connector only, not the output power cord.

2. Verify that the UPS power cord is plugged in.
3. Switch on utility power where the UPS is connected.
4. Switch the UPS input circuit breaker to the ON (|) position.
5. Wait for the UPS front panel display to illuminate.

   The ⚠ indicator flashes on the UPS.
6. Check the UPS front panel display for active alarms or notices (other than "Batteries Disconnected"). Resolve any active alarms before continuing (see "Troubleshooting" on page 135).
7. Switch the UPS battery circuit breaker to the ON (|) position.
8. If optional EBMs are installed, switch all EBM battery circuit breakers to the ON (|) position.
9. Verify that the "Batteries Disconnected" alarm has cleared. Verify that no other alarms appear on the UPS front panel display.

   If the ⚠ indicator is flashing, do not proceed until all alarms are clear. Check the UPS status from the front panel to view the active alarms. Correct the alarms and restart if necessary.
10. Press any button on the front panel display to activate the menu options. Select TURN UPS ON/OFF, TURN UPS ON, and press the ↵ button.
11. Confirm the selection. Press and hold the ↵ button for three seconds, until the UPS stops beeping.

    Verify that the ⏻ indicator illuminates solid, indicating that the UPS is operating normally and any loads not connected through the Load Connector are now energized.

    If the ⚠ indicator is flashing, do not proceed until all alarms are clear. Check the UPS status from the front panel to view the active alarms. Correct the alarms and restart if necessary.

    The UPS should be in Normal mode. By default, Normal mode operates on the High Efficiency setting (see "Normal Mode" on page 97).
12. To energize a load connected through the Load Connector, switch the load connector circuit breaker to the ON (|) position.
13. Press the ESC button until the Start screen appears.

Starting a Parallel System

To start a parallel system (see Figure 60 on page 74):

1. Verify that all UPS circuit breakers are in the OFF (O) position.

NOTE The load connector breaker controls the load connector only, not the output power cord.

2. Verify that all UPS power cords are plugged in and secured by the plug retainers (see Figure 65 on page 81).
3. Verify that all redundant signal cables are connected.
4. Switch on utility power where the UPSs are connected.
5. Switch the UPS input circuit breakers on each UPS to the ON (|) position.

6. Wait for the front panel display on each UPS to illuminate.

   The ⚠ indicator flashes on each UPS.

7. Check each UPS front panel display for active alarms or notices (other than "Batteries Disconnected"). Resolve any active alarms before continuing (see "Troubleshooting" on page 135).

8. Switch all UPS battery circuit breakers to the ON (|) position.

9. If optional EBMs are installed, switch all EBM battery circuit breakers to the ON (|) position.

10. Verify that the "Batteries Disconnected" alarm on each UPS has cleared. Verify that no other alarms appear on any UPS front panel display.

    If the ⚠ indicator is flashing on any UPS, do not proceed until all alarms are clear. Check the UPS status from the front panel to view the active alarms. Correct the alarms and restart if necessary.

11. On any UPS, press any button on the front panel display to activate the menu options. Select TURN UPS ON/OFF and TURN SYSTEM ON.

12. Confirm the selection. Press and hold the ↵ button for three seconds, until the UPS stops beeping.

    Verify that the ⏻ indicator illuminates solid on each UPS, indicating that the UPS is operating normally and any loads not connected through the Load Connector are now energized.

    If the ⚠ indicator on any UPS is flashing, do not proceed until all alarms are clear. Check the UPS status from the front panel to view the active alarms. Correct the alarms and restart if necessary.

    Each UPS should be in Normal mode. By default, Normal mode operates on the High Efficiency setting (see "Normal Mode" on page 97.

13. To energize loads connected through the Load Connectors, switch all load connector circuit breakers to the ON (|) position.

14. On any UPS, press the ESC button until the Start screen appears.

Starting the UPS on Internal Bypass

NOTE Starting the UPS on internal bypass leaves the load unprotected.

To start a standalone UPS on internal bypass (see Figure 60 on page 74):

1. Verify that all UPS circuit breakers are in the OFF (O) position.

NOTE The load connector breaker controls the load connector only, not the output power cord.

2. Verify that the UPS power cord is plugged in.

3. Verify that all UPS power cords are plugged in and secured by the plug retainers (see Figure 65 on page 81).

4. Switch on utility power where the UPS is connected.

5. Switch the UPS input circuit breaker to the ON (|) position.

6. Wait for the UPS front panel display to illuminate.

   The ⚠ indicator flashes on the UPS.

7. Check the UPS front panel display for active alarms or notices (other than "Batteries Disconnected"). Resolve any active alarms before continuing (see "Troubleshooting" on page 135.)
8. Switch the UPS battery circuit breaker to the ON (|) position.
9. If optional EBMs are installed, switch all EBM battery circuit breakers to the ON (|) position.
10. Verify that the "Batteries Disconnected" alarm has cleared. Verify that no other alarms appear on the UPS front panel display.

    If the ⚠ indicator is flashing, do not proceed until all alarms are clear. Check the UPS status from the front panel to view the active alarms. Correct the alarms and restart if necessary.
11. Press any button on the front panel display to activate the menu options. Select CONTROL and GO TO BYPASS MODE.

    The ⟳ indicator illuminates solid and the ∽ indicator flashes, indicating the UPS is operating in Bypass mode. The load is now powered by utility power.

    If the ⚠ indicator is flashing, do not proceed until all alarms are clear. Check the UPS status from the front panel to view the active alarms. Correct the alarms and restart if necessary.
12. Switch the load connector circuit breaker to the ON (|) position.
13. Press the ESC button until the Start screen appears.

Standalone UPS Shutdown

To shut down a standalone UPS (see Figure 60 on page 74):

1. Switch the load connector circuit breaker to the OFF (O) position.

NOTE The load connector breaker controls the load connector only, not the output power cord.

2. Press any button on the front panel display to activate the menu options. Select TURN UPS ON/OFF, TURN UPS OFF, and press the ↵ button.
3. Confirm the selection. Press and hold the ↵ button for three seconds, until the UPS stops beeping.

   The output relays open, the UPS transfers to Standby mode, and the ∽ indicator turns off.
4. Switch the UPS battery circuit breaker to the OFF (O) position.
5. If optional EBMs are installed, switch all EBM battery circuit breakers to the OFF (O) position.
6. Switch the UPS input circuit breaker to the OFF (O) position.
7. Switch off utility power where the UPS is connected.

Individual Paralleled UPS Shutdown

To shut down an individual UPS in the parallel system (see Figure 60 on page 74):

1. Switch the load connector circuit breaker to the OFF (O) position.

NOTE The load connector breaker controls the load connector only, not the output power cord.

2. Press any button on the front panel display to activate the menu options. Select TURN UPS ON/OFF, TURN UPS OFF, and press the ↵ button.
3. Confirm the selection. Press and hold the ↵ button for three seconds, until the UPS stops beeping.

   The output relays open, the UPS transfers to Standby mode, and the ⏻ indicator turns off.
4. Switch the UPS battery circuit breaker to the OFF (O) position.
5. If optional EBMs are installed, switch all EBM battery circuit breakers to the OFF (O) position.
6. Switch the UPS input circuit breaker to the OFF (O) position.
7. Disconnect the redundant signal cable(s) from the UPS.
8. If you are shutting down all the UPSs in a parallel system, repeat Steps 1 through 7 for each UPS or use the procedure in "Parallel System Shutdown", then remove utility power from the system. Otherwise, continue to Step 9.
9. If it is necessary to completely remove power from the individual UPS (without shutting down all UPS modules) disconnect the individual UPS from the BladeUPS Bar.

Parallel System Shutdown

To remove power to the parallel UPS system output (see Figure 60 on page 74):

1. Switch each UPS load connector circuit breaker to the OFF (O) position.

NOTE The load connector breaker controls the load connector only, not the output power cord.

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2. Press any button on any front panel display to activate the menu options. Select TURN UPS ON/OFF, TURN SYSTEM OFF, and press the ↵ button.
3. Confirm the selection. Press and hold the ↵ button for three seconds, until the UPS stops beeping.

   The UPS removes power to the parallel UPS system output.

   The output relays open, the UPSs transfer to Standby mode, and the ⏻ indicators turn off.
4. Switch all UPS battery circuit breakers to the OFF (O) position.
5. If optional EBMs are installed, switch all EBM battery circuit breakers to the OFF (O) position.
6. Switch each UPS input circuit breaker to the OFF (O) position.
7. Switch off utility power where the parallel system is connected.

Transferring the UPS Between Modes

From Normal to Bypass Mode. Press any button to activate the menu options, then select CONTROL and GO TO BYPASS MODE.

From Bypass to Normal Mode. Press any button to activate the menu options, then select CONTROL and GO TO NORMAL MODE. Alternatively (standalone UPS only): Press any button to activate the menu options, then select TURN UPS ON/OFF, TURN UPS ON, and OK to confirm.

Setting Power Strategy

To set the power strategy:

1. Press any button to activate the menu options, then select SETTINGS, USER SETTINGS, and POWER STRATEGY.
2. Select HIGH EFFICIENCY or STANDARD, and OK to confirm.

Configuring Battery Settings

The following battery settings are available:

- Configure the UPS for EBMs
- **BladeUPS 12i model only.** Configure the UPS for customer-supplied external batteries
- Set the level for Battery Low alarm
- Run automatic battery tests

Configuring the UPS for EBMs

To ensure maximum battery runtime, configure the UPS for the correct number of EBMs:

1. Press any button on the front panel display to activate the menu options, then select SETTINGS, USER SETTINGS, BATTERY SETUP, and NUMBER OF EBMS.
2. Use the ↑ or ↓ buttons to select the number of EBMs according to your UPS configuration (see Table 13).

Table 13. EBM Selection for UPS Configurations

UPS Configurations	Selection
UPS only	0 (default)
UPS + 1 EBM	1
UPS + 2 EBMs	2
UPS + 3 EBMs	3
UPS + 4 EBMs	4

3. Press the ↵ button to save the setting.
4. Press the ESC button until the Start screen appears.

Configuring the UPS for Customer-Supplied External Batteries

NOTE This setting is available only for BladeUPS 12i models.

If you installed a customer-supplied external battery using the External Battery Interconnect accessory, set the external battery capacity (in Watts per cell) to configure the UPS for the customer-supplied external battery. The UPS uses the setting to adjust the predicted battery runtime.

CAUTION

Do not attach the External Battery Interconnect to an EBM. Doing so may cause damage to the EBM or the UPS.

NOTE To install the External Battery Interconnect accessory, refer to the External Battery Interconnect User's Guide.

1. Press any button on the front panel display to activate the menu options, then select SETTINGS, USER SETTINGS, BATTERY SETUP, and EXTERNAL BATTERY CAPACITY.
2. Use the ↑ or ↓ buttons to select the Watts per cell.

   For the correct Watts per cell, see the specifications sheet for the customer-supplied external batteries.
3. Press the ↵ button to save the setting.
4. Press the ESC button until the Start screen appears.

NOTE The UPS sets the charge current to the maximum that the UPS charger can supply and disables the 24-hour recharge battery diagnostic test.

Setting the Battery Low Alarm Level

The default Battery Low Alarm Level setting provides approximately 2.5 minutes of battery warning for a UPS. Additional EBMs installed in a parallel system can provide a longer warning time.

1. Press any button on the front panel display to activate the menu options, then select SETTINGS, USER SETTINGS, BATTERY SETUP, and Battery Low Alarm Level.
2. Use the ↑ or ↓ buttons to select the volts per cell.

   To adjust the Battery Low Alarm Level setting to provide different warning times for a parallel system with additional EBMs installed, see Table 14.
3. Press the ↵ button to save the setting.
4. Press the ESC button until the Start screen appears.

Table 14. Suggested Battery Low Alarm Level Settings

Warning Time (in Minutes)	Number of EBMs Installed	Battery Low Alarm Level (User Setting)		
		20% Load	50% Load	100% Load
2	1	1.783	1.821	1.854
	2	1.776	1.811	1.831
	3	1.772	1.798	1.818
	4	1.768	1.781	1.805
3	1	1.805	1.848	1.891
	2	1.793	1.833	1.859
	3	1.787	1.820	1.843
	4	1.781	1.803	1.831
4	1	1.822	1.868	1.918
	2	1.807	1.850	1.883
	3	1.789	1.836	1.866
	4	1.793	1.818	1.850

NOTE Values are approximate.

Table 14. Suggested Battery Low Alarm Level Settings (Continued)

Warning Time (in Minutes)	Number of EBMs Installed	Battery Low Alarm Level (User Setting)		
		20% Load	50% Load	100% Load
5	1	1.835	1.884	1.941
	2	1.818	1.863	1.903
	3	1.799	1.849	1.883
	4	1.803	1.823	1.865

NOTE Values are approximate.

Running Automatic Battery Tests

Battery tests may rely on backfeeding the utility, using the utility as a load. If the connected load is above 65% the UPS will only use the load to do the test. Some sites may choose to disable battery testing if their source is not capable of being backfed. Examples of such sources include generators, other UPSs, and other stiff or soft sources.

If a source is not capable of being backfed, the UPS will abort the test (due to utility failure) and will maintain the load and log the event. Further consequences depend on the source (for example, another UPS feeding the BladeUPS module may trip off).

NOTE For automatic and manual battery tests, the UPS determines when it is appropriate to run the test. Battery tests run only when the system is in High Efficiency mode.

To disable battery testing:

1. Press any button on the front panel display to activate the menu options, then select SETTINGS, USER SETTINGS, BATTERY SETUP, and Automatic Battery Tests.
2. Use the ↑ or ↓ buttons to select Disabled.
3. Press the ↵ button to save the setting.
4. Press the ESC button until the Start screen appears.

Chapter 6 Communication

This chapter describes the:

- DB-9 communication port
- X-Slot cards
- Relay output contacts
- Programmable signal inputs
- Remote emergency power-off (REPO)
- Parallel communication

Figure 71 shows the location of the communication options and control terminals on the UPS.

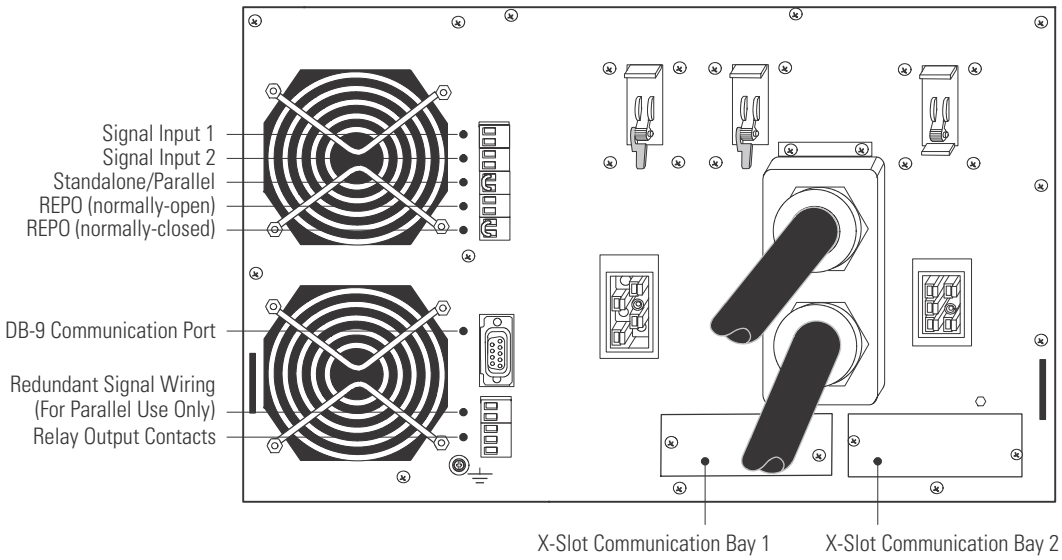


Figure 71. Communication Options and Control Terminals (Standalone UPS shown)

Installing Communication Options and Control Terminals

To install the communication options and control terminals:

1. Install the appropriate X-Slot card and/or necessary cable(s) (see Figure 71 and Figure 72).

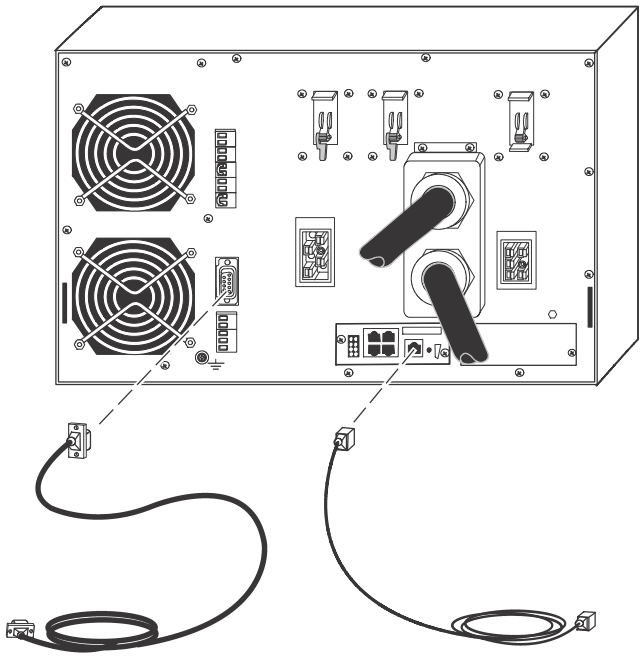


Figure 72. Installing Communication Cables

2. Connect the cables to the appropriate location.

   See "Communication Options" on page 108 or "Control Terminals" on page 110 for detailed information.

3. Route and tie the cable(s) out of the way.
4. Continue to "Operation" on page 93 to start up the UPS.

Communication Options

The BladeUPS has serial communication capabilities through the DB-9 communication port or through an X-Slot card in one of the available bays.

The UPS supports two serial communication devices according to the following table:

Table 15. Supported Communication Devices

Independent	Multiplexed	
X-Slot 1 Communication Bay	**X-Slot 2 Communication Bay**	**DB-9 Communication Port**
Any X-Slot card	Any X-Slot card	Not in use
Any X-Slot card	Eaton Relay Interface Card Powerware Hot Sync CAN Bridge Card	Available
Any X-Slot card	Not in use	Available

NOTE 1 You can configure relays, signal inputs, and the serial port baud rate through the front panel menus (see Table 12 on page 95).

NOTE 2 In a UPS connected to utility power, X-Slot cards remain powered on even if the input breaker is off.

DB-9 Communication Port

To establish communication between the UPS and a computer, connect your computer to the UPS communication port using the supplied communication cable.

When the communication cable is installed, power management software can exchange data with the UPS. The software polls the UPS for detailed information on the status of the power environment. If a power emergency occurs, the software initiates the saving of all data and an orderly shutdown of the equipment.

Figure 73 identifies the cable pins and Table 17 describes the pin functions. See Figure 71 on page 107 for the communication port location.

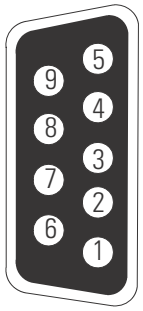


Figure 73. Communication Port

Table 16. Communication Port Pin Assignment

Pin Number	Signal Name	Function	Direction from the UPS
2	TxD	Transmit to external device	Out
3	RxD	Receive from external device	In
5	GND	Signal common (tied to chassis)	—

X-Slot Cards

X-Slot cards allow the UPS to communicate in a variety of networking environments and with different types of devices. The BladeUPS has two available communication bays for any X-Slot card, including:

- **Relay Interface Card** - has isolated dry contact (Form-C) relay outputs for UPS status: Utility failure, Low battery, UPS alarm/OK, or On bypass.
- **Modbus Card** - allows you to continuously and reliably monitor the UPSs in your Building Management System (BMS).

- **Industrial Relay Card (IRC)** - is used to indicate the operating status of the UPS system using the customer's monitoring equipment. The IRC uses four isolated normally-open or normally-closed dry relay contacts to indicate the UPS status. You can monitor Normal, Bypass, Battery, and Alarm mode.
- **Power Xpert UPS Card** - has SNMP and HTTP capabilities as well as monitoring through a Web browser interface; connects to a twisted-pair Ethernet (10/100BaseT) network. It is compatible with Eaton IPM/IPP software, Power Xpert monitoring software, and also provides ModBus TCP connectivity to allow setup of UPS shutdown schedules, as well as UPS test and control. In addition, you can attach an Environmental Monitoring Probe to obtain humidity, temperature, smoke alarm, and security information.

See Figure 71 on page 107 for the location of the two X-Slot communication bays.

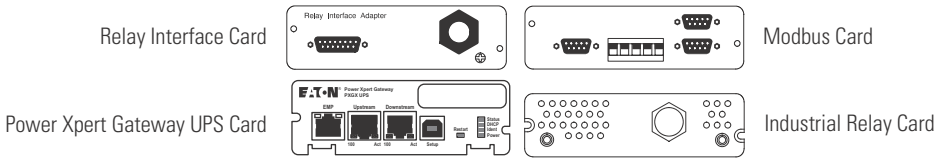


Figure 74. Optional X-Slot Cards

Control Terminals

Connect the cables to the control terminals with a mating connector. Input and output terminals have a functional isolation from terminal to terminal. They are connected to the UPS through individual 1 MΩ resistors.

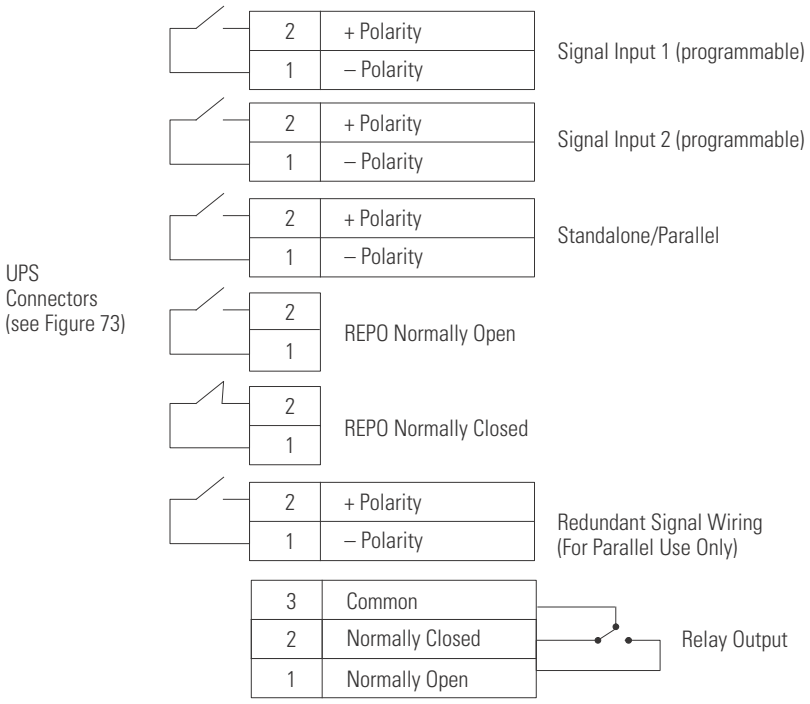


Figure 75. External Control Terminal Connections

NOTE If using a semiconductor switch type, pay attention to the proper polarity. A relay or other mechanical control is preferred.

Relay Output Contacts

The UPS incorporates a programmable relay output with potential free contacts for remote alarm indications (see Figure 71 on page 107). You can obtain an additional four relay outputs with the X-Slot compatible Relay Interface Card.

CAUTION

The relay output contacts must not be connected to any utility connected circuits; the utility requires reinforced insulation. The relay output contacts have a maximum rating of 30 Vac/1A and 60 Vdc/2A nominal values.

Programmable Signal Inputs

The UPS incorporates two programmable signal inputs (see Figure 71 on page 107). Use of non-polar (relay) control input is recommended. The pins must be shorted with maximum resistance of 10 ohm in order to activate the specific input.

NOTE See Figure 75 on page 110 for the polarity and verify these connections if polarity control is required.

Table 17 shows the programmable settings for the signal inputs.

Table 17. Programmable Signal Inputs

Signal	Description
empty	Not in use (default).
building alarm 1–2	These alarms can be activated separately or at the same time with other building alarms. Building alarms are local only to the UPS.
on generator	If active, the High Efficiency setting is disabled (BladeUPS 12i model only) and battery tests are disabled.[1]
ext battery breaker	If active, the UPS knows that the external batteries are disconnected.[2]
request bypass	If active, the UPS transfers the load to bypass when the bypass voltage, frequency, and phase rotation are within the allowed limits.[1]
force bypass	If active, the UPS is forced to static bypass operation regardless of the bypass status.[1]
on/OFF	If active, the UPS output turns off regardless of the mode of operation. Auxiliary power, communication, and rectifier/battery charger remain functional. Restart is initiated immediately when this signal is inactive.[2]
charger off	If active, the battery charge function is disabled. In a utility power outage, it supports the discharge of batteries.[2]

[1] Program for only one UPS in a parallel system.

[2] Program for all UPSs in a parallel system.

Use the programmable signal inputs to emulate some of the features usually seen on larger three-phase systems. For example:

- Configure the signal from a smoke detector or water leak detector to shut down the system.
- Configure a vibration sensor or air conditioner sensor to shut down the system.
- Set actions for alarms from a generator, such as disabling the charger for an undersized generator or shutdown for a failed generator.
- Configure an ATS (automatic transfer switch) sensor to transfer the system to Bypass mode.

Remote Emergency Power-off

REPO is used to shut down the UPS from a distance. This feature can be used for shutting down the load and the UPS by thermal relay, for example in the event of room overtemperature. When REPO is activated, the UPS shuts down all converters, de-energizes all system relays, trips the UPS battery circuit breaker, and powers down within 10–15 seconds. Note, however, that the unit continues to have logic power (display is still active) and is not fully powered down until input power is disconnected from the unit.

WARNING

The REPO circuit is an IEC 60950 safety extra low voltage (SELV) circuit. This circuit must be separated from any hazardous voltage circuits by reinforced insulation.

CAUTION

- The REPO must not be connected to any utility connected circuits. Reinforced insulation to the utility is required. The REPO switch must have a minimum rating of 24 Vdc and 20 mA and be a dedicated latching-type switch not tied into any other circuit. The REPO signal must remain active for at least 250 ms for proper operation.
- To ensure that the UPS stops supplying power to the load during any mode of operation, the input power must be disconnected from the UPS when the emergency power-off function is activated.

NOTE For Europe, the emergency switch requirements are detailed in Harmonized document HD-384-48 S1, "Electrical Installation of the Buildings, Part 4: Protection for Safety, Chapter 46: Isolation and Switching."

REPO Connections

Wire Function		Terminal Wire Size Rating	Suggested Wire Size
REPO	L1 L2	4–0.32 mm^2 (12–22 AWG)	0.82 mm^2 (18 AWG)

NOTE Leave the REPO connector installed in the REPO port on the UPS even if the REPO function is not needed.

There are two REPO positions that may be used, normally-open (NO) or normally-closed (NC). See Figure 71 on page 107 for REPO locations.

The pins on the NC REPO connector are connected together. When this connection is open, the logic circuitry completely shuts down the UPS, thus preventing the power from supplying the load. If the use of NC REPO operation is desired, remove the jumper wire and connect an NC external switch. If the use of NO REPO operation is desired, connect an NO external switch.

Installing REPO for a Standalone UPS

To install a REPO switch for a standalone UPS:

1. Verify that the UPS is turned off and all power sources are removed. See "Standalone UPS Shutdown" on page 102 for shutdown instructions.
2. Securely mount the remote REPO switch. Recommended locations include near operator's consoles or near exit doors. Refer to the REPO switch manufacturer's installation instructions for enclosure dimensions and wiring knockouts.
3. Connect the appropriate external switch to the selected REPO contact. See Figure 76 for NO REPO wiring and Figure 77 for NC REPO wiring.
4. Reconnect the REPO connector pins and turn on the UPS manually to restart. The pins must be shorted to keep the UPS running. Maximum resistance is 10 ohm.

NOTE 1 The REPO wiring of a standalone UPS can be connected with the REPO wiring of a parallel system if the same sense (NO or NC) contacts are used. Be sure to match the polarity for the contacts.

NOTE 2 Always test the REPO function before applying your critical load to avoid accidental load loss.

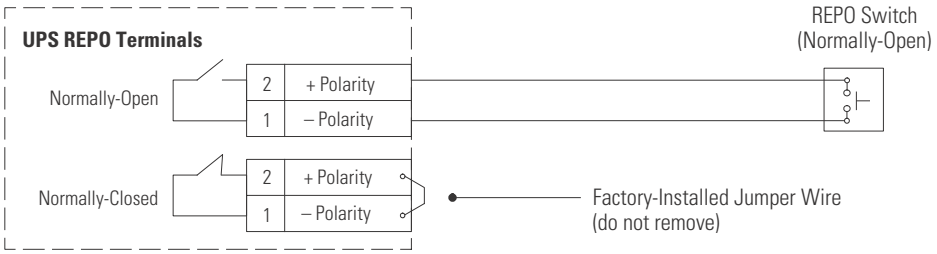


Figure 76. Normally-Open REPO Switch Wiring in a Standalone UPS

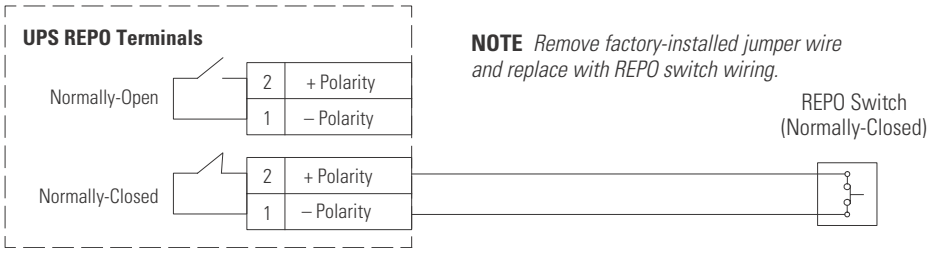


Figure 77. Normally-Closed REPO Switch Wiring in a Standalone UPS

Installing REPO for a Parallel System

You can install an optional REPO circuit that shuts down the entire parallel system using a single switch. To install a REPO switch for a parallel system, the selected REPO command (NO or NC) contacts from each UPS in the system must be in parallel.

To install a REPO switch for a parallel system:

1. Verify that the UPS system is turned off and all power sources are removed. See "Parallel System Shutdown" on page 103 for shutdown instructions.
2. Securely mount the remote REPO switch. Recommended locations include near operator's consoles or near exit doors. Refer to the REPO switch manufacturer's installation instructions for enclosure dimensions and wiring knockouts.
3. Connect Pin 1 to Pin 1 and connect Pin 2 to Pin 2 of each UPS in parallel for the selected REPO contacts, then connect the appropriate external switch to the selected REPO contact. See Figure 78 for NO REPO wiring and Figure 79 for NC REPO wiring.
4. Reconnect the REPO connector pins and turn on the UPS manually to restart. Short the pins to keep the UPS running. Maximum resistance is 10 ohm.

NOTE Always test the REPO function before applying your critical load to avoid accidental load loss.

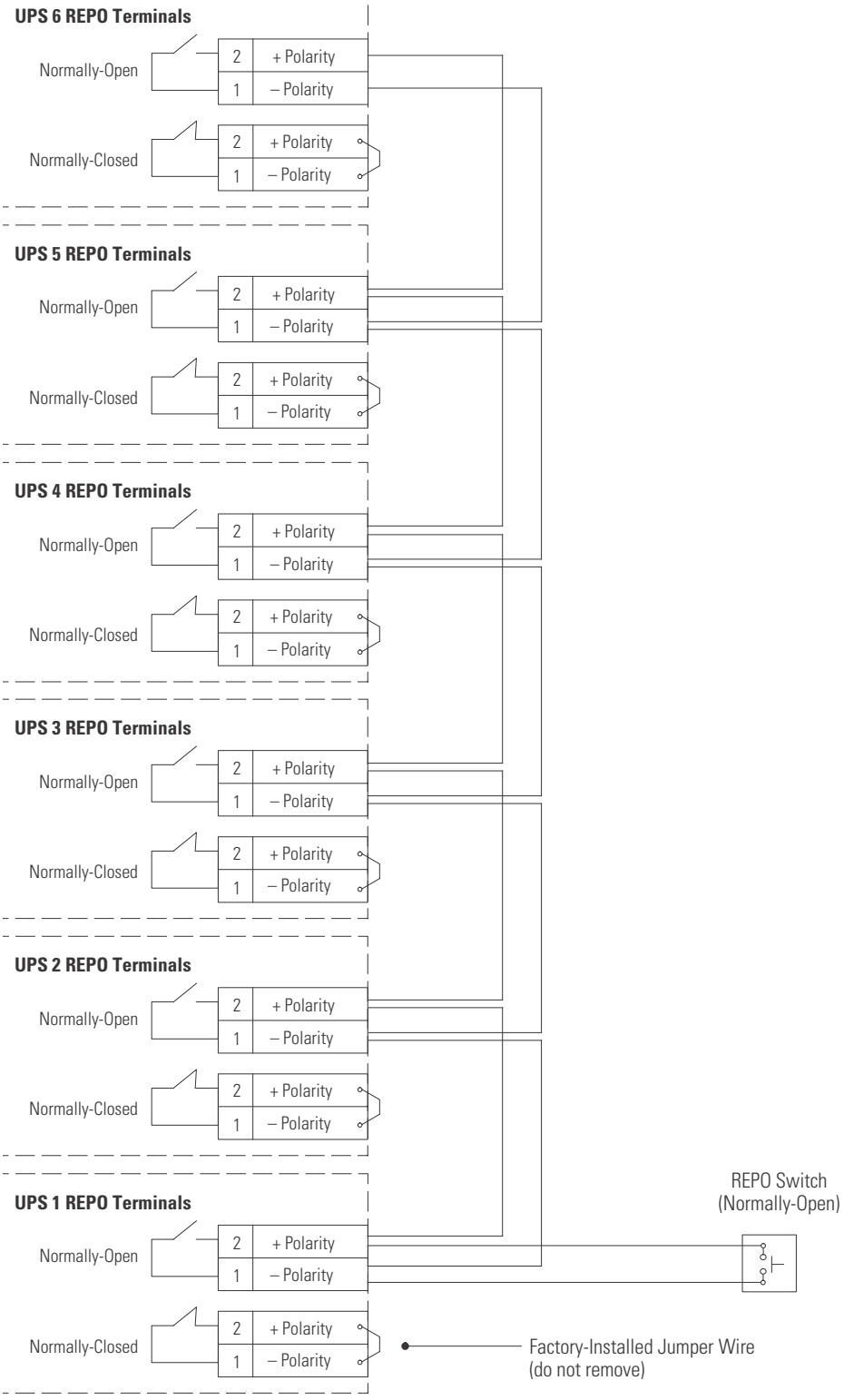
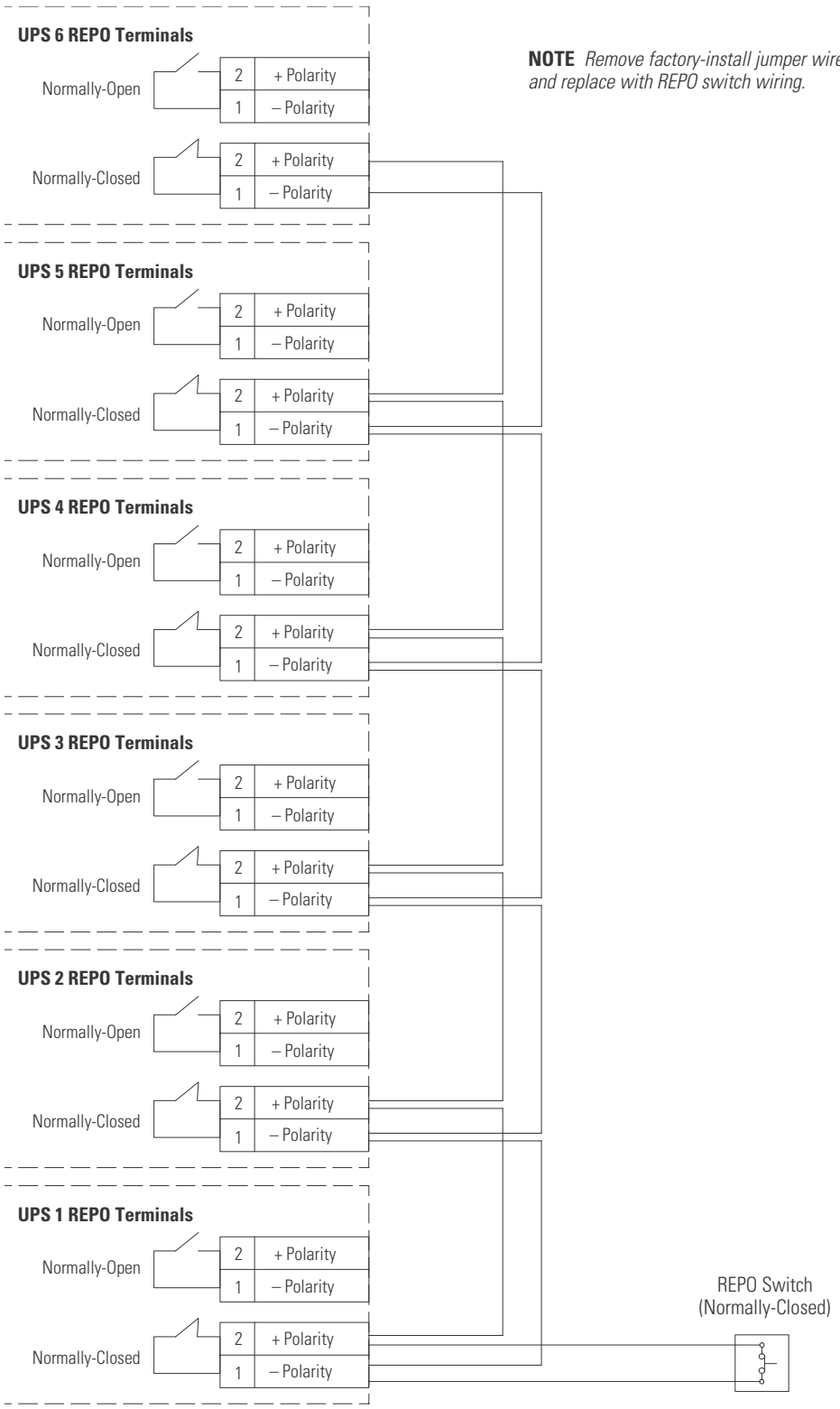


Figure 78. Normally-Open REPO Switch Wiring in a Parallel System



NOTE *Remove factory-install jumper wires and replace with REPO switch wiring.*

Figure 79. Normally-Closed REPO Switch Wiring in a Parallel System

Parallel Communication

The CAN Bridge Card in each paralleled UPS provides connectivity for system metering and operational mode control. Startup, shutdown, and auto-calibration commands given at one UPS also command the other UPSs in the parallel system. The UPSs in a parallel system are in constant communication to monitor settings and status information.

Mode Transfers

If one UPS in a parallel system transfers from High Efficiency operation to Standard operation, the other UPSs transfer also.

When a parallel system is on battery, the front panels display the battery status information of the battery with the lowest runtime remaining. In a capacity related system, when the first UPS shuts down, the other UPSs also shut down. In a parallel system that is not fully loaded, the system shifts load to UPSs with the strongest batteries or additional EBMs to maximize runtime.

In a parallel system configured for redundancy, the UPSs use a distributed bypass, and the following alarms cause an individual UPS to shut down instead of transferring to Bypass mode:

- Failure of the fan, fuse, temperature sensor, or power supply
- Inverter AC under voltage
- Battery current limit
- DC link under voltage
- Battery over voltage

Redundant Signal Wiring

BladeUPS 12i model only. The redundant signal wiring provides redundant backfeed protection in case of CAN failure in the parallel system. If the CAN fails, the UPSs transfer to Normal mode. The system runs unsynchronized, and any UPS can transfer to Battery mode as necessary. If any UPS must transfer to Bypass mode, the redundant signal wiring allows the entire parallel system to transfer to Bypass mode without backfeeding.

BladeUPS 12 model only. The redundant signal wiring provides synchronization protection in case of CAN failure in the parallel system. The system uses the redundant signal wiring to determine the system state when the CAN is down. The system operates the same as with CAN, except for a Check Parallel Board alarm.

Auto-Identification

The BladeUPS parallel system can assign identities to each UPS in the system automatically. To take advantage of this feature, wire the CAN Bridge Cards together as described in "Parallel UPS Installation" on page 75.

When starting up, the UPS with the blue terminating plug installed in the CAN IN port identifies itself as UNIT 1. The next UPS wired identifies itself as UNIT 2, and so forth. The last UPS with the second blue terminating plug installed in the CAN OUT port terminates the RJ-14 cable network. The auto-identification sequence takes about 1–2 minutes to complete once all the UPSs in the parallel system have logic power.

If a UPS is shut down or otherwise loses logic power, the UPS will re-identify itself in the proper sequence once logic power is restored.

If a UPS is shut down and removed from the parallel system, the other UPSs in the system will not re-identify themselves to compensate for the missing UPS until logic power to all the UPSs is cycled. For example, if you remove UNIT 2 and rewire UNIT 3's CAN IN port to UNIT 1's CAN OUT port, UNIT 3 will not re-identify itself as UNIT 2 until logic power is cycled. The CAN Bridge Cards for UNIT 1 and UNIT 3 continue to function normally without the need to re-identify.

Metering

The Output and Load Receptacle meter readings differ between a parallel system and a standalone UPS. In a parallel system, one UPS reads the Load Receptacle value for the total system (the others read zero), but each UPS displays its own Output value.

For example, in a two-unit parallel system with one Anderson load connection for 12 kVA, the Load Receptacle current would read 12 kVA on one UPS and zero on the other UPS, but the Output measurement would be 6 kVA on each UPS (half the total).

In a standalone UPS, the load can be connected from the outlet cord or the Anderson load connector. The Output measurement would be the total load on the UPS, and the Load Receptacle reading would be the portion supplied by the Anderson load connector.

Chapter 7 UPS Maintenance

This chapter explains how to:

- Care for the UPS and batteries
- Replace the UPS batteries and EBMs
- Test new batteries
- Replace the electronics module
- Replace a UPS in a parallel system
- Recycle used batteries or UPS
- Update the UPS firmware

UPS and Battery Care

For the best preventive maintenance, keep the area around the UPS clean and dust-free. If the atmosphere is very dusty, clean the outside of the system with a vacuum cleaner.

For full battery life, keep the UPS at an ambient temperature of 25°C (77°F).

NOTE The batteries in the UPS are rated for a 3–5 year service life. The length of service life varies, depending on the frequency of usage and ambient temperature. Batteries used beyond expected service life will often have severely reduced runtimes. Replace batteries at least every 5 years to keep units running at peak efficiency.

Storing the UPS and Batteries

If you store the UPS for a long period, recharge the battery every 6 months by connecting the UPS to utility power. The batteries charge to 80% capacity in fewer than 5 hours. However, Eaton recommends that the batteries charge for 48 hours after long-term storage.

Check the battery recharge date on the shipping carton label. If the date has expired and the batteries were never recharged, do not use the UPS. Contact your service representative.

When to Replace Batteries

When the indicator flashes slowly and the audible alarm beeps intermittently, the batteries may need replacing. Contact your service representative to order new batteries.

Replacing Batteries

NOTE DO NOT DISCONNECT the batteries while the UPS is in Battery mode.

Batteries can be replaced easily without turning the UPS off or disconnecting the load.

If you prefer to remove input power to change the batteries, see"Individual Paralleled UPS Shutdown" on page 101.

Consider all warnings, cautions, and notes before replacing batteries.

WARNING

- Servicing should be performed by qualified service personnel knowledgeable of batteries and required precautions. Keep unauthorized personnel away from batteries.
- Batteries can present a risk of electrical shock or burn from high short circuit current. Observe the following precautions: 1) Remove watches, rings, or other metal objects; 2) Use tools with insulated handles; 3) Do not lay tools or metal parts on top of batteries, 4) Wear rubber gloves and boots.
- When replacing batteries, replace with the same type and number of batteries or battery packs. Contact your service representative to order new batteries.
- Proper disposal of batteries is required. Refer to your local codes for disposal requirements.
- Never dispose of batteries in a fire. Batteries may explode when exposed to flame.
- Do not open or mutilate the battery or batteries. Released electrolyte is harmful to the skin and eyes and may be extremely toxic.
- Determine if the battery is inadvertently grounded. If inadvertently grounded, remove source from ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock can be reduced if such grounds are removed during installation and maintenance (applicable to equipment and remote battery supplies not having a grounded supply circuit).
- ELECTRIC ENERGY HAZARD. Do not attempt to alter any battery wiring or connectors. Attempting to alter wiring can cause injury.
- Disconnect charging source prior to connecting or disconnecting battery terminals.

How to Replace EBMs

CAUTION

The EBM is heavy (see page 136). Lifting the cabinet into the rack requires a minimum of two people.

To replace the EBMs:

1. Switch all battery circuit breakers to the OFF (O) position (see Figure 39 on page 49).
2. Unplug the EBM cable from the UPS.

   If additional EBMs are installed, unplug the EBM cable from the battery connector on each EBM.
3. If not already installed, install the supplied mounting brackets on the new EBM.
4. Replace the EBM. See "Recycling the Used Battery or UPS" on page 129 for proper disposal.
5. Plug the new EBM into the UPS as shown in Figure 39 on page 49.

   For additional EBMs, plug the EBM cable into the battery connector on the adjacent EBM.
6. Remove the breaker tie from the circuit breaker on all EBMs.
7. Switch all battery circuit breakers to the ON (|) position.

How to Replace UPS Internal Batteries

CAUTION

- The UPS internal batteries are heavy (see page 136). Each battery tray holds two rows of five batteries. Use caution when handling the heavy battery trays.
- Pull the battery trays out onto a flat, stable surface. The battery trays are unsupported when you pull them out of the UPS.

To replace the battery trays in the UPS cabinet:

1. Verify that the battery circuit breaker is in the OFF (O) position (see Figure 60 on page 74).
2. Remove the UPS front cover and set it aside (see Figure 80):

   Grasp the fingergrips on both sides of the cover and pull the cover forward firmly. Unplug the LCD cable connecting the back of the control panel to the electronics module.

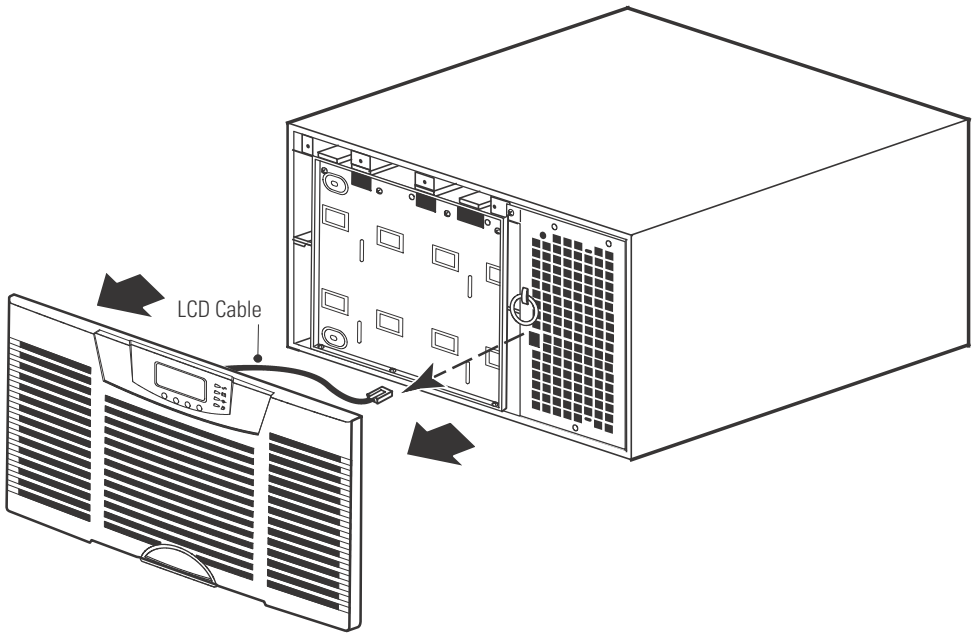


Figure 80. Removing the UPS Front Cover

NOTE Disconnecting the control panel from the electronics module automatically transfers the UPS to Bypass mode.

3. Remove the eight screws on the battery cover plate and retain. Remove the plate. See Figure 81.

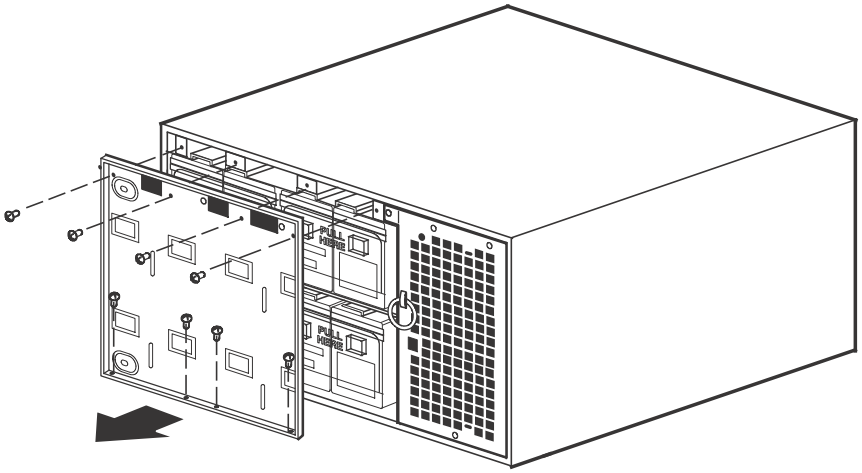


Figure 81. Removing the UPS Battery Cover Plate

CAUTION

- The UPS internal batteries are heavy (see page 136). Each battery tray holds two rows of five batteries. Use caution when handling the heavy battery trays.
- Pull the battery trays out onto a flat, stable surface. The battery trays are unsupported when you pull them out of the UPS.

4. Untuck the plastic handle at the end of a battery tray. Pull the handle firmly to remove the tray. Use both hands to support the tray as it leaves the UPS cabinet.

   Repeat for each battery tray. See "Recycling the Used Battery or UPS" on page 129 for proper disposal.

5. Slide the new battery trays into the cabinet (see Figure 82 for two battery string installations and Figure 83 for single-string installations). Verify that each tray is properly aligned before sliding in the tray.

NOTE When installing single-string battery trays for BladeUPS 5.1 kVA, always install the single-string trays in the bottom battery compartment.

6. When a tray is fully installed, tuck the plastic handle on the end of the tray into place.

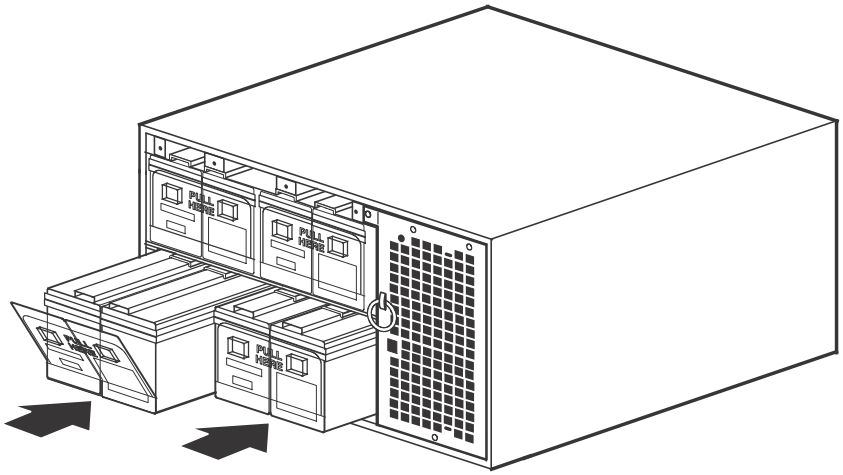


Figure 82. Installing the UPS Battery Trays (Two Battery Strings)

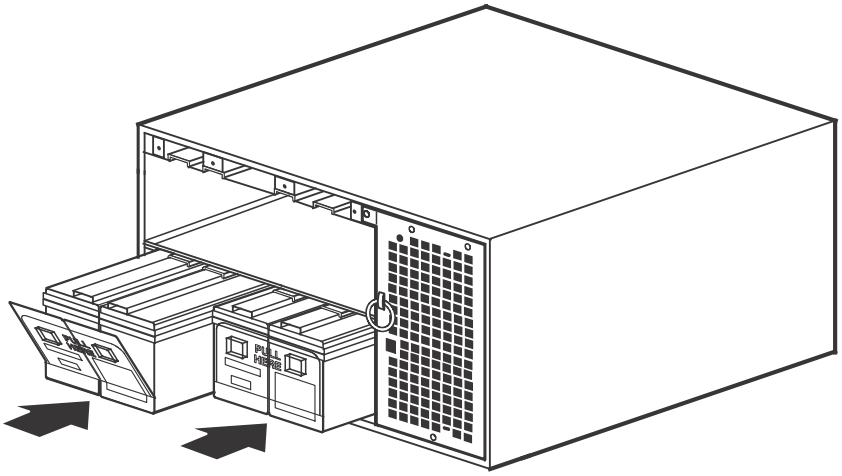


Figure 83. Installing the UPS Single-string Battery Trays for 5.1 kVA BladeUPS

7. Reinstall the battery cover plate.
8. Replace the UPS front cover (see Figure 84):

   Plug the LCD cable from the control panel on the front cover into the connector on the electronics module. Use care to loop the LCD cable gently in front of the electronics module.

   Push the top of the front cover firmly into place, and then push the bottom firmly into place.

NOTE Reconnecting the control panel to the electronics module automatically transfers the UPS to Normal mode.

9. Verify that no alarms are indicated on the control panel.

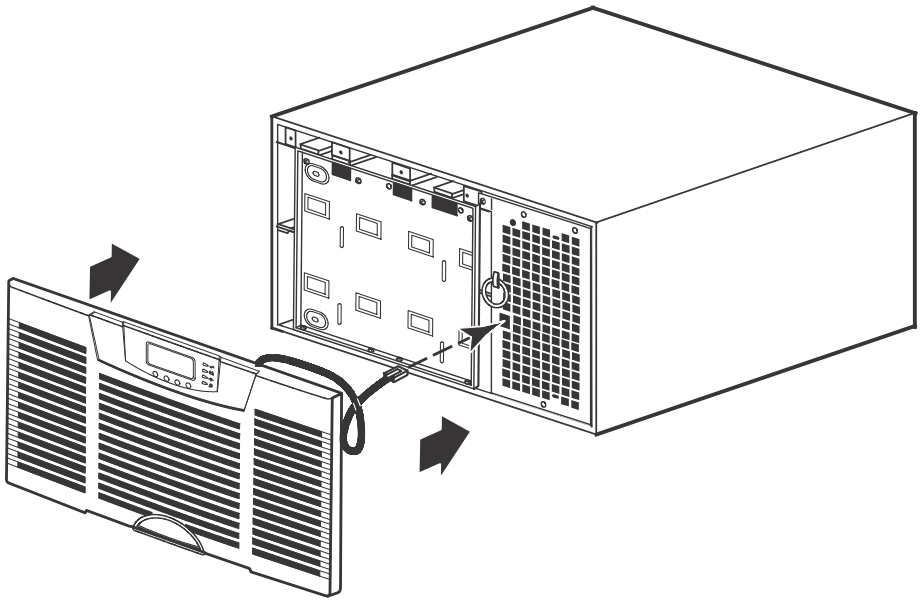


Figure 84. Replacing the UPS Front Cover

Testing New Batteries

NOTE 1 The batteries must be fully charged and the UPS must not be in Battery mode to perform the battery test.

NOTE 2 For an accurate battery test, test the UPS with at least 10% load applied to the UPS.

To test new batteries:

1. Plug the UPS into a power outlet for 48 hours to charge the battery.
2. Press any button to activate the menu options.
3. Select CONTROL then START BATTERY TEST.

NOTE The battery test may not start immediately. The request is scheduled and the UPS determines when the test starts.

During the battery test, the front panel displays "Battery Test Pending."

A failed battery test initiates a Battery Test Failed alarm.

To cancel a battery test in progress:

1. Press any button to activate the menu options.
2. Select CONTROL, START BATTERY TEST, then CANCEL.

Replacing the Electronics Module

You can easily replace the electronics module without turning the UPS off or disconnecting the load. Battery mode is not available and your equipment is not protected; however, the utility power continues to be filtered passively by the UPS.

If you prefer to remove input power to change the electronics module, see "Individual UPS Shutdown" on page 102.

NOTE DO NOT DISCONNECT the electronics module while the UPS is in Battery mode.

To replace the electronics module:

1. **Standalone UPS configurations only.** Transfer the UPS to Bypass mode. Continue to Step 3.

   Parallel for capacity configurations only. Transfer the UPS to Bypass mode. The CAN bus remains energized.

   Parallel for redundancy configurations only. No mode transfer is necessary. If the UPS is operating in a parallel for redundancy configuration when its electronics module is removed, the load automatically transfers to the remaining UPSs. The CAN bus remains energized.

NOTE In single unit and capacity parallel systems, disconnecting the control panel from the electronics module automatically transfers the UPS to Bypass mode. However, transferring the UPS to Bypass mode manually BEFORE disconnecting the control panel provides extra protection to the electronics module and is recommended.

2. **Parallel configurations only.** Disconnect the redundant signal cable(s) from the UPS. For the location of the redundant signal cable, see Figure 64 on page 79.
3. Remove the UPS front cover and the electronics module and set them aside (see Figure 85):
   - To remove the UPS front cover, grasp the fingergrips on both sides of the cover and pull the cover forward firmly. Unplug the LCD cable connecting the back of the control panel to the electronics module.
   - To remove the electronics module, remove the electronics module locking screw at the top left of the electronics module and retain. Grasp the ring handle at the middle of the module and pull the module slowly out of the cabinet. Pull firmly to unseat the connectors. Use two hands to support the module.

NOTE Treat the electronics module with care to avoid damaging the fans, connectors, or internal circuitry.

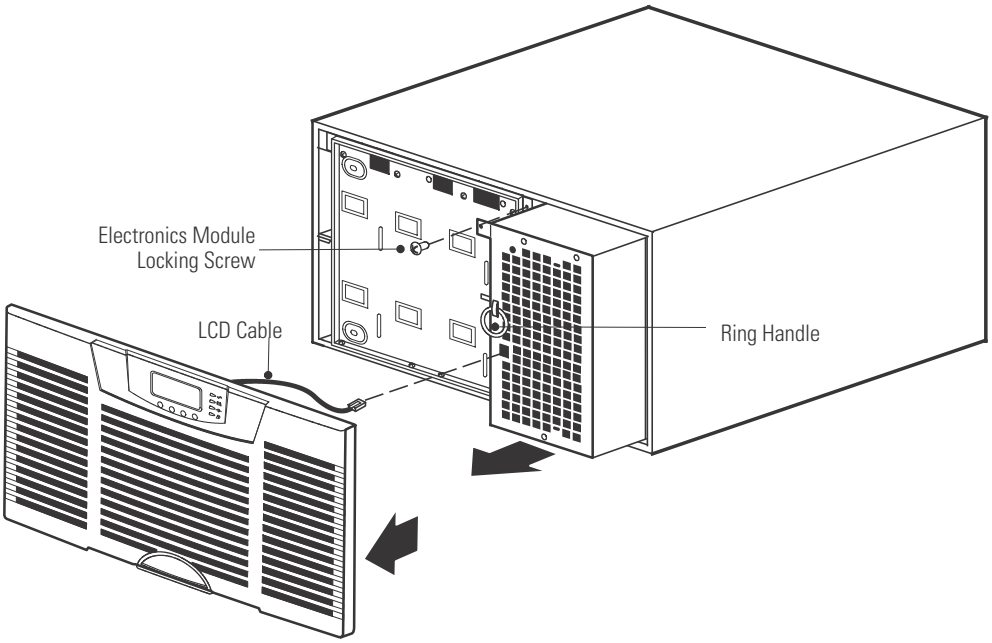


Figure 85. Removing the UPS Front Cover and Electronics Module

4. Label the original module with masking tape or some other identifier. Record the serial number of the replacement module for your warranty.

   If not returning the electronics module for warranty, see the following section, "Recycling the Used Battery or UPS" on page 129 for proper disposal.

5. Insert the replacement module by sliding it carefully into the cabinet. Verify that it seats firmly against the rear of the cabinet.

   Reinstall the electronics module locking screw.

6. **Parallel configurations only.** Reconnect the redundant signal cable(s).

7. Replace the UPS front cover (see Figure 86):

   Plug the LCD cable from the control panel on the front cover into the connector on the electronics module. Use care to loop the LCD cable gently in front of the electronics module.

   Push the top of the front cover firmly into place, and then push the bottom firmly into place.

8. Verify that no alarms are indicated on the control panel.

9. Transfer the UPS to Normal mode.

10. Verify that all UPSs are set to use the same power strategy (High Efficiency or Standard). You can change the power strategy from the front panel. See User Settings in Table 12 on page 95.

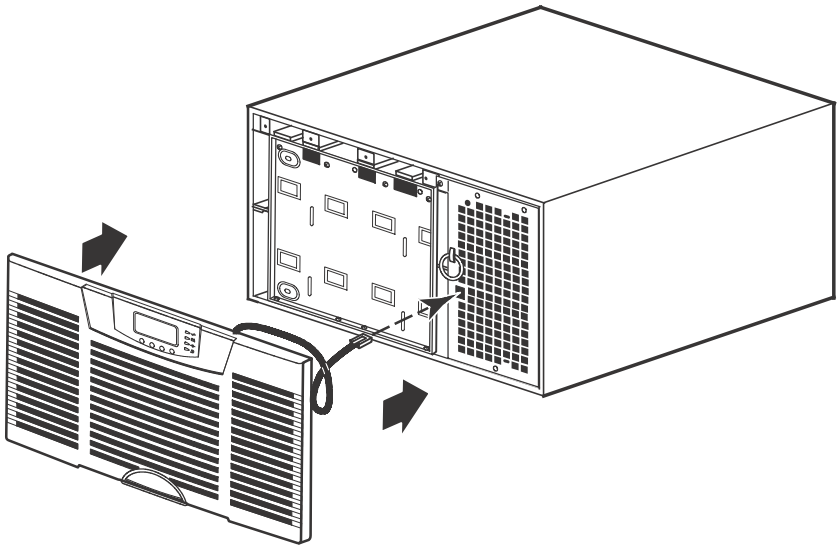


Figure 86. Replacing the UPS Front Cover

Replacing a UPS in a Parallel System

You can replace a UPS in a parallel system without powering down the system or protected load.

NOTE DO NOT TURN OFF the system.

To replace a UPS in a parallel system:

1. Press any button on the front panel display of the UPS to be replaced to activate the menu options. Select TURN UPS ON/OFF, TURN UPS OFF, and press the ↵ button.
2. Confirm the selection. Press and hold the ↵ button for three seconds, until the UPS stops beeping.

   The UPS removes power to the UPS output.

   The output relays open, the UPS transfers to Standby mode, and the ⏻ indicators turn off.
3. Disconnect the redundant signal and CAN Bridge Card cables from the UPS to be replaced. For the location of the cables, see Figure 64 on page 79.
4. Disconnect any other cables, such as REPO signals or serial communications.
5. Switch the UPS load connector circuit breaker to the OFF (O) position.
6. If optional EBMs are installed, switch the EBM battery breakers to the OFF (O) position and disconnect the EBM cable from the UPS battery connector. For the location of the EBM battery breakers and the UPS battery connector, see Figure 39 on page 49.
7. Switch all UPS breakers (load connect breaker, input breaker, and battery breaker) to the OFF (O) position.

NOTE 1 The "Batteries Disconnected" alarm may appear on the UPS front panel. The alarm resolves when the LCD is disconnected and may be ignored.

NOTE 2 The load connector breaker controls the load connector only, not the output power cord.

8. Disconnect the UPS from the BladeUPS Bar.
9. Remove the UPS front cover and the electronics module (see Figure 85 on page 126):
   - To remove the UPS front cover, grasp the fingergrips on both sides of the cover and pull the cover forward firmly. Unplug the LCD cable connecting the back of the control panel to the electronics module.
   - To remove the electronics module, remove the electronics module locking screw at the top left of the electronics module and retain. Grasp the ring handle at the middle of the module and pull the module slowly out of the cabinet. Pull firmly to unseat the connectors. Use two hands to support the module.

NOTE Treat the electronics module with care to avoid damaging the fans, connectors, or internal circuitry.

10. Remove the eight screws on the battery cover plate and retain. Remove the plate. See a similar removal in Figure 81 on page 122.

CAUTION

- The UPS internal batteries are heavy (see page 136). Each battery tray holds two rows of five batteries. Use caution when handling the heavy battery trays.
- Pull the battery trays out onto a flat, stable surface. The battery trays are unsupported when you pull them out of the UPS.

11. Untuck the plastic handle at the end of a battery tray. Pull the handle firmly to remove the tray. Use both hands to support the tray as it leaves the UPS cabinet.

    Repeat for each battery tray. See the following section"Recycling the Used Battery or UPS" for proper disposal.

12. Remove the CAN Bridge Card and any optional X-Slot card from its X-Slot communication bay.
13. Remove the UPS from the rack carefully to avoid damage to other equipment or the parallel input cord.
14. If not returning the UPS for warranty, see the following section"Recycling the Used Battery or UPS" for proper disposal.
15. If replacing UPS or placing UPS into service in a different parallel configuration, continue to "UPS Installation into an Existing Parallel System" on page 84.

Recycling the Used Battery or UPS

Contact your local recycling or hazardous waste center for information on proper disposal of the used battery or UPS.

WARNING

- Do not dispose of the battery or batteries in a fire. Batteries may explode. Proper disposal of batteries is required. Refer to your local codes for disposal requirements.
- Do not open or mutilate the battery or batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.

CAUTION

Do not discard the UPS or the UPS batteries in the trash. This product contains sealed, lead?acid batteries and must be disposed of properly. For more information, contact your local recycling/ reuse or hazardous waste center.

CAUTION

Do not discard waste electrical or electronic equipment (WEEE) in the trash. For proper disposal, contact your local recycling/reuse or hazardous waste center.

Updating the UPS Firmware

To keep the UPS firmware updated with the latest improvements and benefits, visit www.eaton.com/ powerquality often for updates. You can download the latest firmware version. The downloadable file includes the instructions for installing the update.

NOTE Firmware v2.0 does not operate in a parallel system with v1.xx. When adding a new UPS to a parallel system, verify that all UPSs in the parallel system are updated to v2.x. See Step 15 on page 91 to view the firmware version on the display panel.

Chapter 8 Service and Troubleshooting

Service and Support

Use the troubleshooting chart in this chapter to determine the UPS alarm condition and resolution. If you have additional questions or problems with the UPS, call your **Local Distributor** or the **Help Desk** at one of the following telephone numbers and ask for a UPS technical representative.

United States:	**1-800-356-5737**
Canada:	**1-800-461-9166 ext 260**
All other countries:	**Call your local service representative**

Please have the following information ready when you call for service:

- Model number
- Serial number
- Firmware version number
- Date of failure or problem
- Symptoms of failure or problem
- Customer return address and contact information

If repair is required, you will be given a Returned Material Authorization (RMA) Number. This number must appear on the outside of the package and on the Bill Of Lading (if applicable). Use the original packaging or request packaging from the Help Desk or distributor. Units damaged in shipment as a result of improper packaging are not covered under warranty. A replacement or repair unit will be shipped, freight prepaid for all warrantied units.

NOTE For critical applications, immediate replacement may be available. Call the **Help Desk** for the dealer or distributor nearest you.

Typical Alarms and Conditions

The BladeUPS module is designed for durable, automatic operation and also alerts you whenever potential operating problems may occur. Usually the alarms shown by the control panel do not mean that the output power is affected. Instead, they are preventive alarms intended to alert the user.

Table 18describes typical alarms and conditions. If an alarm appears with a service code, contact the Help Desk.

To check the Event Log for a list of active alarms:

1. Press any button on the front panel display to activate the menu options.
2. Press the down button until EVENT LOG displays.
3. Press the right arrow button to display the list of alarms and conditions.

Table 18. Troubleshooting Alarms and Conditions

Alarm or Condition	Possible Cause	Action
ON BATTERY Yellow LED is on. One short beep every five seconds.	A utility failure has occurred and the UPS is in Battery mode.	The UPS is powering the equipment with battery power. Prepare your equipment for shutdown.
BATTERY LOW Yellow LED is on. Con tinuous beep for ten seconds.	The UPS is in Battery mode and the battery is running low.	This warning is approximate, and the actual time to shutdown may vary significantly. Depending on the UPS load and number of Extended Battery Modules (EBMs), the Battery Low warning may occur before the batteries reach 25% capacity. See Table 27 on page 138 for estimated runtimes and "Setting the Battery Low Alarm Level" on page 104 for configuration information. When utility power is restored, the UPS restarts automatically, provides power to the load, and charges the battery.
BATTERY BREAKER Red LED is on. One beep every three seconds.	The UPS does not recognize the internal batteries.	Verify that the UPS battery circuit breaker is in the ON (|) position. If the condition persists, contact your service representative.
ON BYPASS Yellow LED is on. One beep every three seconds.	The UPS is in Bypass mode.	The equipment transferred to bypass utility power. Battery mode is not available and your equipment is not protected; however, the utility power continues to be passively filtered by the UPS. Check for one of the following alarms: overtemperature, overload, UPS failure, hot swap, or remote emergency power-off (REPO).
BYPASS UNAVAILABLE Yellow LED is flashing slowly. One beep every second.	Bypass is not available because the UPS may be receiving bypass utility power that may be unstable or in brownout conditions.	Check the bypass utility. The UPS continues to supply power to your equipment. Check for one of the following alarms: bypass over or under voltage, bypass over or under frequency, or bypass unavailable.
BATTERY CONNECTION Red LED is on. One beep every three seconds.	The UPS does not recognize the internal batteries.	If the condition persists, contact your service representative.
	Two or more battery trays are disconnected.	Verify that all battery trays are fully seated and locked in place. If the condition persists, contact your service representative.
OVERLOAD Red LED is on. One beep every three seconds.	Power requirements exceed the UPS capacity (greater than 100% of nominal; see Table 24 on page 137 for specific output overload ranges).	Remove some of the equipment from the UPS. The UPS continues to operate, but may switch to Bypass mode if the load does not decrease. The alarm resets when the condition becomes inactive.

Table 18. Troubleshooting Alarms and Conditions (Continued)

Alarm or Condition	Possible Cause	Action
OVERTEMPERATURE Red LED is on. One beep every three seconds.	The UPS internal temperature is too high or a fan has failed.	Shut down the UPS. Clear vents and remove any heat sources. Allow the UPS to cool. Ensure that the airflow around the UPS is not restricted. Restart the UPS. If the condition persists, contact your service representative.
SITE WIRING FAULT Red LED is on. One beep every three seconds.	Ground wire connection does not exist, or the line and neutral wires are reversed in the wall outlet.	Have a qualified electrician correct the wiring.
The UPS does not provide the expected backup time.	The batteries need charging or service.	Apply utility power for 48 hours to charge the batteries. If the condition persists, contact your service representative.
	Battery circuit breakers are in the OFF (O) position.	Switch all battery circuit breakers to the ON (|) position.
Power is not available at the UPS output receptacle.	The UPS is in Standby mode.	Supply power to the connected equipment: Press any button to display the menu options. Select TURN UPS ON/OFF, TURN UPS ON, and OK to confirm. Press and hold OK for 3 seconds, until the UPS stops beeping.
	The REPO switch is active or the NC REPO jumper is missing.	Reset the REPO switch and restart the UPS. Verify that the NC REPO jumper is present if an NC REPO switch is not installed.
The UPS does not start.	The main utility breaker is off.	Verify that the main utility breaker is on.
	The power cord is not connected correctly.	Have a licensed electrician check the power cord connections.
	The batteries or electronics module is being replaced.	Complete the replacement procedure before starting the UPS.
	The REPO switch is active or the NC REPO jumper is missing.	Reset the REPO switch and restart the UPS. Verify that the NC REPO jumper is present if an NC REPO switch is not installed.
	Rectifier phase rotation error	Have electrical contractor correct phase rotation.
The UPS does not turn off.	The batteries or electronics module is being replaced.	Complete the replacement procedure before shutting down the UPS.
The UPS operates normally, but some or all of the protected equipment is not on.	The equipment is not connected to the UPS correctly.	Verify that the equipment is plugged into the UPS receptacles.
	Output circuit breaker is in the OFF (O) position.	Switch output circuit breaker to the ON (|) position.
Battery test pending.	A battery test is in progress.	Wait until the battery test completes. To cancel a test in progress, see “Testing New Batteries” on page 124.
Battery test failed.	The batteries need service.	Contact your service representative. Clear the alarm by opening the battery breaker.
Battery test did not run.	The bypass utility was not present or was not within limits.	Verify that the bypass utility is available and within limits.
	Batteries were not fully charged.	Apply utility power for 48 hours to charge the batteries, then restart the battery test.
	User cancelled the battery test through the front panel.	Restart the battery test.
	The UPS is not in the proper phase of the cycle.	Wait for the cycle to complete (up to one month).

Table 18. Troubleshooting Alarms and Conditions (Continued)

Alarm or Condition	Possible Cause	Action
Battery test aborted.	The bypass utility became unavailable during the test.	Verify that the bypass utility is available and within limits. Restart the battery test. If the battery test aborts repeatedly, see "Running Automatic Battery Tests" on page 105.
	User cancelled the battery test through the front panel.	Restart the battery test.
The UPS does not transfer to Bypass mode.	The bypass utility does not qualify.	Check the bypass utility. The UPS is receiving bypass utility power that may be unstable or in brownout conditions.
	Bypass mode is disabled.	Check that the bypass user settings are configured appropriately (see "User Settings" on page 95).
Check Parallel Board.	The UPS is not recognizing another paralleled UPS.	From the UPS Status menu, select the Units on CAN Bus option and verify that all UPSs appear in the list. If any UPS is missing, verify the Powerware Hot Sync CAN Bridge Card connections and recheck the status from the UPS front panel. If all UPSs appear in the list, check the redundant signal wiring (see Figure 64 on page 79). Set the system to internal Bypass mode. If the condition persists, contact your service representative.
Abnormal output voltage at startup.	The system is not configured as parallel.	Verify the CAN wiring (see Figure 63 on page 78). Verify that the line cord is installed properly. Shut down the UPS where the alarm is indicated. Start up the UPS. Select the Turn System On option through the front panel of the UPS that was turned off.
Selective Trip.	The UPS detects an internal fault.	If the condition persists, contact your service representative.
Redundancy Loss Due to Overload.	The specified power rating of the parallel system has been exceeded.	The load is supported, but the system lacks redundant protection while the overload persists. Remove some of the protected equipment.
	Parallel-Ready System only. Parallel Operation mode is set to "Redundant Mode."	BladeUPS parallel systems are defaulted to "Redundant Mode." For a parallel-ready system (a single UPS installed to be part of a future parallel system) set the Parallel Operation Settings / Parallel Operation Mode to "Capacity Mode" to prevent unnecessary alarms.
Configuration Error and the UPS does not start.	The UPS failed to identify itself as a paralleled UPS within two minutes after utility power was applied.	Verify the CAN wiring (Figure 63 on page 78). If the condition persists, contact your service representative.
Software Incompatibility Detected.	The UPS detects a paralleled UPS with a later firmware version.	Mixing major firmware versions is not supported. For minor firmware versions, the alarm does not prevent operation, but different firmware versions in a parallel system cause conflicts. Verify that all UPSs in the parallel system have the same firmware version. For updates, see"Updating the UPS Firmware" on page 129
	During parallel system startup, the UPS detects a UPS in the system with a different OEM number.	Verify that all UPSs in the parallel system are from the same manufacturer. UPSs with different OEM numbers will not parallel.

Silencing the Alarm

Before silencing an alarm, check the alarm condition and perform the applicable action to resolve the condition.

Press any button on the front panel display to silence the alarm. If the alarm status changes, the alarm beeps again, overriding the previous alarm silencing.

Chapter 9 Specifications

This chapter provides the following specifications:

- Model list
- Weights and dimensions
- Electrical input and output
- Environmental and safety
- Battery

Table 19. Model List

UPS Model Number	Power Levels (Rated at Nominal Inputs)
BladeUPS 12	12 kVA or 12 kW at 208V See Note
BladeUPS 12i	12 kVA or 12 kW at 400V See Note
BladeUPS 8	8 kVA or 8 kW at 208V See Note
BladeUPS 5.1	5.1 kVA or 5.1 kW at 208V See Note
EBM Model Number	
BladeUPS EBM	
BladeUPS Bar Model Number	
BladeUPS Bar 4-High	For up to 4 UPSs
BladeUPS Bar 6-High	For up to 6 UPSs

NOTE Derated for line cord and nominal line voltage

Cord Model Number	Description	Input Plug Type	Length (Input/Output)
UPSCord12UL	12 kW UL input	IEC 309-60A	3.7m (12 ft)
UPSCord12ULR	12 kW UL input/output	IEC 309-60A	1.8/1.2m (6/4 ft)
UPSCordPUL	12 kW UL parallel	Anderson See Note	0.5m (1.5 ft)
UPSCord12CE	12 kW CE input	IEC 309-32A	3.7m (12 ft)
UPSCord12CER	12 kW CE input/output	IEC 309-32A	1.2/1.2m (4/4 ft)
UPSCord12PCE	12 kW CE parallel	Anderson See Note	0.5m (1.5 ft)
UPSCord8UL	8 kW UL input.output	L21-30P	3.05/1.83m (10/6 ft)
UPSCord5UL	5.1 kW UL input/output	L21-20P	3.05/1.83m (10/6 ft)

NOTE Customized Anderson connector for use with Eaton BladeUPS Bar

Table 20. Weights and Dimensions

	UPS	Extended Battery Module (EBM)
Dimensions (W x D x H)	441 x 660 x 261 mm 17.4″ x 26″ x 10.3″ (6U)	438 x 660 x 131 mm 17.2″ x 26.0″ x 5.2″ (3U)
Weights See Note	BladeUPS 12 model without internal batteries: 61 kg (135 lb) BladeUPS 12i model without internal batteries: 63.5 kg (140 lb) BladeUPS 12 model with internal batteries: 141 kg (311 lb) BladeUPS 12i model with internal batteries: 143 kg (316 lb) BladeUPS 5.1 model with single string of internal batteries: 100 kg (219 lb) BladeUPS 5.1 model with dual strings of internal batteries: 140 kg (307 lb) BladeUPS 8 model with single string of internal batteries: 142 kg (311 lb) Individual battery: 2 kg (4.4 lb) Each battery tray: 20 kg (44 lb) 208V electronics module: 19.5 kg (43 lb) 400V electronics module: 21.8 kg (48 lb)	77 kg (170 lb)

NOTE For weights of preassembled systems, see Table 1 on page 18.

Table 21. BladeUPS Bar

	BladeUPS Bar 4-High	BladeUPS Bar 6-High
Dimensions (W x D x H)	152 x 145 x 296 mm (6.0″ x 5.7″x 51.0″)	152 x 45 x 1829 mm (6.0″ x 5.7″ x 72.0″)
Weight	BladeUPS Bar: 18.1 kg (40 lb) Wireway enclosure: 20.4 kg (45 lb) Total weight: 38.5 kg (85 lb)	BladeUPS Bar: 24.5 kg (54 lb) Wireway enclosure: 20.4 kg (45 lb) Total weight: 44.9 kg (99 lb)
UPS Connections	Up to 4, using Anderson input/output connectors	Up to 6, using Anderson input/output connectors
Rack Placement	Bottom wireway fits into the bottom 6U of standard rack space. Top wireway fits into the top 6U of standard rack space.	

Table 22. BladeUPS Module Rack

Dimensions (W x D x H)	645 x 1125 x 2058 mm (25.4″ x 44.3″x 81″) Sizes include side panels and door handles
Weight	Rack without side panels or casters: 99 kg (219 lb) Side panels (each): 8.5 kg (19 lb); Casters (4): 5 kg (10 lb) Total weight: 121 kg (267 lb)

Table 23. Electrical Input

	BladeUPS 12 Model	BladeUPS 12i Model	BladeUPS 8 Model	BladeUPS 5.1 Model
Nominal Voltage	120/208V three-phase	230/400V three-phase	120/208V three-phase	120/208V three-phase
Nominal Frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Frequency Range	45–65 Hz	45–65 Hz	45–65 Hz	45–65 Hz
Default Frequency	Auto-detected	Auto-detected	Auto-detected	Auto-detected
Rated Input Current	36A	24A	24A	16A
Connections	IEC 309-60A power cord	IEC 309-32A power cord	NEMA L21-30P	NEMA L21-20P
	Paralleling available for 12 kW modules only. For paralleling, a single Anderson input/output cord connects to the BladeUPS Bar (see Table 19 on page 135).		BladeUPS 8 and BladeUPS 5.1 kW cannot be paralled	
Noise Filtering	MOVs and common mode line filter			

Table 23. Electrical Input

	BladeUPS 12 Model	BladeUPS 12i Model	BladeUPS 8 Model	BladeUPS 5.1 Model
Input Power Factor	High Efficiency setting: load dependent Standard setting: >0.99			
Input Mode	Three-phase			
Input Source	5-wire with continuous neutral. **NOTE:** Contact your Eaton UPS sales specialist for operation with 4-pole ATS switches.			

Table 24. Electrical Output

	BladeUPS 12 Model	BladeUPS 12i Model	BladeUPS 8 Model	BladeUPS 5.1 Model
Nominal Output Voltage	120/208 Vac three-phase	230/400 Vac three-phase	120/208V three-phase	120/208V three-phase
Output Voltage Variation	104–132 Vac phase to neutral, 180–229 Vac phase to phase	207–253 Vac phase to neutral, 358–438 Vac phase to phase	104–132 Vac phase to neutral, 180–229 Vac phase to phase	104–132 Vac phase to neutral, 180–229 Vac phase to phase
Connections	IEC 309-60A power cord	IEC 309-32A power cord	NEMA L21-30P	NEMA L21-20P
	For paralleling, a single Anderson input/output cord connects to the BladeUPS Bar (see Table 19 on page 135).			
Short Circuit Capability (Battery Mode)	84A, <300 ms	44A, <300 ms	84A, <300 ms	84A, <300 ms
Short Circuit Capability (Normal Mode)	Limited by 50A input breaker	Limited by 25A input breaker	Limited by 50A input breaker	Limited by 50A input breaker
Nominal Output Frequency	50–60 Hz auto-detection (Normal mode) 50 or 60 Hz (Battery mode)			
Output Frequency Variation	Synchronized (Normal mode) ±0.1 when not synchronized with source (Battery mode)			
Output Overload	100–110%: load transfers to Bypass mode after 10 minutes 110–125%: load transfers to Bypass mode after 1 minute 125–150%: load transfers to Bypass mode after 5 seconds >150%: load transfers to Bypass mode after 300 ms			
Voltage Waveform	Standard mode and Battery mode: Sine wave; <2% THD with linear load; <5% with nonlinear load			
Full Output	Three-phase			

Table 25. Environmental and Safety

	BladeUPS 12 Model	BladeUPS 12i Model	BladeUPS 8 Model	BladeUPS 5.1 Model
Surge Suppression	ANSI C62.41 Category B3	EN 61000-4-6	ANSI C62.41 Category B3	ANSI C62.41 Category B3
Safety Conformance	UL 1778 4th edition; CSA C22.2, No. 107.3	UL 1778 4th edition, EN and IEC 62040-1-1	UL 1778 4th edition; CSA C22.2, No. 107.3	UL 1778 4th edition; CSA C22.2, No. 107.3
Agency Markings	cULus, ICES, CE	cULus, CE	cULus	cULus
EMC (Class A)	FCC Part 15	EN 62040-2	FCC Part 15	FCC Part 15
Operating Temperature	0°C to 40°C (32°F to 104°F) Optimal battery performance: 5°C to 25°C (41°F to 77°F)			
Storage Temperature	0°C to 25°C (32°F to 77°F)			
Transit Temperature	-25°C to 55°C (-13°F to 131°F)			

Table 25. Environmental and Safety

	BladeUPS 12 Model	BladeUPS 12i Model	BladeUPS 8 Model	BladeUPS 5.1 Model
Relative Humidity	Operating: 5–95% noncondensing Non-operating: 5–95% relative humidity, 38.7°C (101.7°F) Maximum wet bulb temperature with no cosmetic damage			
Operating Altitude	Up to 1,000 meters (3,300 ft) above sea level; up to 2,000 meters (6,600 ft) with 1% derating per +100 meters (330 ft)			
Transit Altitude	Up to 15,000 meters (49,000 ft) above sea level			
Heat Dissipation	1432 BTU/hr maximum at 100% rated load (High Efficiency mode) 4094 BTU/hr maximum at 100% rated load (Standard mode)			
Audible Noise	Less than 58 dBA at 1 meter typical (Normal mode) Less than 64 dBA at 1 meter typical (Battery mode)			
Leakage Current	<3.5 mA			
Communication	DB-9: 1200–19200 baud			

Table 26. Battery

	UPS Internal Batteries	+1 EBM	+2 EBMs	+3 EBMs	+4 EBMs
Configuration	(40) 12V, 5 Ah (20) 12V, 5Ah (5.1 kW only)	(20) 12V, 9 Ah	(40) 12V, 9 Ah	(60) 12V, 9 Ah	(80) 12V, 9 Ah
Type	Sealed, maintenance-free, valve-regulated, lead-acid				
Monitoring	Advanced monitoring for earlier failure detection and warning				
Charging (in minutes)	8–10 times the discharge time				

NOTE Charging times are approximate and are to 80% usable capacity at nominal line voltage after full load discharge.

Table 27. Standalone UPS Battery Runtimes at Full/Half Load (in Minutes)

Model	kW	UPS Internal Batteries	+1 EBM	+2 EBMs	+3 EBMs	+4 EBMs
BladeUPS 12	12/6	4.7/13.6	9.5/27	17/42	27/60	34/76
BladeUPS 12i	12/6	4.7/13.6	9.5/27	17/42	27/60	34/76
BladeUPS 8	8/4	8.7/23	17.7/41.5	27.9/65.5	43.0/94.1	54.7/120
BladeUPS 5.1 Single battery string	5.1/2.55	5.9/16.1	21.7/45.8	37.2/80.1	59.2/128	79.0/175
BladeUPS 5.1 Two battery strings	5.1/2.55	18.1/35.6	32.1/66.3	48.1/101.6	71.8/ 53.4	91.1/198.0

NOTE Battery times are approximate and vary depending on the load configuration and battery charge.

Table 28. Parallel UPS System Battery Runtimes at Full/Half Load (in Minutes at Capacity)

Number of UPSs	kW	UPS Internal Batteries	+1 EBM	+2 EBMs	+3 EBMs	+4 EBMs
2	24/12	4.7/13.6	9.5/27	17/42	27/60	34/76
3	36/18	4.7/13.6	9.5/27	17/42	27/60	34/76

NOTE Battery times are approximate and vary depending on the load configuration and battery charge.

Table 28. Parallel UPS System Battery Runtimes at Full/Half Load (in Minutes at Capacity)

Number of UPSs	kW	UPS Internal Batteries	+1 EBM	+2 EBMs	+3 EBMs	+4 EBMs
4	48/24	4.7/13.6	9.5/27	17/42	27/60	34/76
5	60/30	4.7/13.6	9.5/27	17/42	27/60	34/76

NOTE Battery times are approximate and vary depending on the load configuration and battery charge.

Table 29. Parallel UPS System Battery Runtimes at Full/Half Load (in Minutes with N+1)

Number of UPSs	kW	UPS Internal Batteries	+1 EBM	+2 EBMs	+3 EBMs	+4 EBMs
2	12/6	14/30	27/56	42/89	60/128	76/165
3	24/12	8.7/23	18/42	28/66	43/94	55/120
4	36/18	7.3/20	15/37	24/57	38/82	48/105
5	48/24	6.7/19.2	13/34	23/54	35/77	44/98
6	60/30	6.2/18.4	13/33	22/52	33/74	42/94

NOTE Battery times are approximate and vary depending on the load configuration and battery charge.

Chapter 10 Warranty

Limited Warranty

Eaton® UPS Model: BladeUPS® (Global)

WARRANTOR: The warrantor for the limited warranties set forth herein is Eaton Corporation, an Ohio Corporation ("Eaton").

LIMITED WARRANTY: This limited warranty (this "Warranty") applies only to the original Purchaser (the "End-User") of any Eaton BladeUPS Products (individually and collectively, the "Product") purchased and registered with Eaton and cannot be transferred. This restriction applies even in the event that the Product is initially sold by Eaton for resale to an End-User. This Warranty gives you specific legal rights, and you may also have other rights which vary from State to State (or jurisdiction to jurisdiction).

LIMITED WARRANTY PERIOD: The period covered by this Warranty for the Product is eighteen (18) months from the date of Product shipment.

WHAT THIS LIMITED WARRANTY COVERS: Eaton warrants that the Product and battery (individually and collectively, the "Warranted Items") are free of defects in material and workmanship. If, in the opinion of Eaton, a Warranted Item is defective and the defect is within the terms of this Warranty, Eaton's sole obligation will be to repair or replace such defective Warranted Item (including providing service, parts and labor, as applicable), at the option of Eaton.

PROCEDURES FOR REPAIR OR REPLACEMENT OF WARRANTED ITEMS: The Warranted Item will be repaired or replaced at an Eaton site or such other location as determined by Eaton.

If the Warranted Item is to be replaced by Eaton, and the End-User supplies a credit card number or purchase order for the value of the replacement product, Eaton will use commercially reasonable business efforts to ship (via standard ground shipment and at no cost to the End-User) the replacement Warranted Item to the End-User within one (1) business day after Eaton receives notice of the warranty claim. In such case, the End-User must return (at Eaton's expense) the defective Warranted Item to Eaton in the same packaging as the replacement Warranted Item received by the End-User or as otherwise instructed by Eaton. If Eaton does not receive the defective Warranted Item, Eaton will either charge the End-User's credit card, or send the End-User an invoice (which the End-User agrees to pay), for the value of the replacement product.

If the Warranted Item is to be replaced by Eaton, but the End-User is unwilling or unable to supply a credit card number or purchase order for the value of the replacement product, Eaton will use commercially reasonable business efforts to ship (via standard ground shipment and at no cost to the End-User) the replacement Warranted Item to the End-User within one (1) business day after Eaton receives the defective product from the End-User.

In any case, Eaton will provide shipping instructions and will pay its designated carrier for all shipping charges for return of defective equipment and replacement of Warranted Items. Any returned Warranted Item or parts that are replaced may be new or re-conditioned. All Warranted Items returned to Eaton and, in any replacement endeavor, all parts removed by Eaton shall become the property of Eaton.

WHAT THIS LIMITED WARRANTY DOES NOT COVER: This Warranty does not cover any defects or damages caused by: (a) failure to properly store the Product before installation, including the charge of batteries no later than the date indicated on the packaging; (b) shipping and delivery of the Product if shipping is FOB Factory; (c) damage caused by fire, flood, lightning, vandalism, acts of God, End-User's neglect, misuse, misapplication, incorrect connection, or external damage, or that has been subject to repair or alteration by End-User (or a third party) not authorized by Eaton in writing; (d) repair or alteration not performed by an authorized Eaton Customer Service Engineer or Agent; (e) improper testing, operation, maintenance, adjustment, or modification of any kind not authorized in writing by Eaton personnel or performed by an authorized Eaton Customer Service Engineer or Agent; or (f) use of the Product under other than normal operating conditions or in a manner inconsistent with the Product's labels or instructions.

This Warranty is not valid if the Product's serial numbers have been removed or are illegible. Any Warranted Items repaired or replaced pursuant to this Warranty will be warranted for the remaining portion of the original Warranty subject to all the terms thereof.

Eaton shall not be responsible for any charges for testing, checking, removal, or installation of Warranted Items.

EATON DOES NOT WARRANT EQUIPMENT NOT MANUFACTURED BY EATON. IF PERMITTED BY THE APPLICABLE MANUFACTURER, EATON SHALL PASS THROUGH SUCH MANUFACTURER'S WARRANTIES TO END-USER.

EATON DOES NOT WARRANT SOFTWARE, INCLUDING SOFTWARE EMBEDDED IN PRODUCTS, THAT IS NOT CREATED BY EATON. WITHOUT LIMITING THE FOREGOING, EATON SPECIFICALLY DOES NOT WARRANT SOFTWARE (SUCH AS LINUX) THAT WAS CREATED USING AN "OPEN SOURCE" MODEL OR IS DISTRIBUTED PURSUANT TO AN OPEN SOURCE LICENSE.

THIS WARRANTY IS THE SOLE AND EXCLUSIVE WARRANTY OFFERED BY EATON WITH RESPECT TO THE PRODUCTS AND SERVICES AND, EXCEPT FOR SUCH FOREGOING WARRANTY, EATON DISCLAIMS ALL OTHER WARRANTIES INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, TITLE, NON-INFRINGEMENT, AND FITNESS FOR A PARTICULAR PURPOSE. CORRECTION OF NON-CONFORMITIES IN THE MANNER AND FOR THE PERIOD OF TIME PROVIDED ABOVE SHALL CONSTITUTE EATON'S SOLE LIABILITY AND END-USER'S EXCLUSIVE REMEDY FOR FAILURE OF EATON TO MEET ITS WARRANTY OBLIGATIONS, WHETHER CLAIMS OF THE END-USER ARE BASED IN CONTRACT, IN TORT (INCLUDING NEGLIGENCE OR STRICT LIABILITY), OR OTHERWISE. SOME STATES OR JURISDICTIONS DO NOT ALLOW THE EXCLUSION OF EXPRESS OR IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION MAY NOT APPLY TO YOU. IN THAT EVENT, SUCH WARRANTIES ARE LIMITED IN DURATION TO THE LIMITED WARRANTY PERIOD. SOME STATES OR JURISDICTIONS DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS OR THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS AND/OR EXCLUSIONS MAY NOT APPLY TO YOU.

LIMITATION OF LIABILITY: The remedies of the End-User set forth herein are exclusive and are the sole remedies for any failure of Eaton to comply with its obligations hereunder. In no event shall Eaton be liable for any indirect, incidental, special, or consequential damages of any kind or type whatsoever, resulting from, or in connection with, any claim or cause of action, whether brought in contract or in tort (including negligence or strict liability). Some States or jurisdictions do not allow the exclusion of limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. Eaton shall not be responsible for failure to provide service or parts due to causes beyond Eaton's reasonable control. In no case will Eaton's liability under this Warranty exceed the replacement value of the Warranted Items.

END-USER'S OBLIGATIONS: In order to receive the benefits of this Warranty, the End-User must register the product warranty (via mail or online at www.eaton.com/powerquality "Register a Product"); use the Product in a normal way; follow the Product's operation and maintenance manual; and protect against further damage to the Product if there is a covered defect.

OTHER LIMITATIONS: Eaton's obligations under this Warranty are expressly conditioned upon receipt by Eaton of all payments due from End-User (including interest charges, if any). During such time as Eaton has not received payment of any amount due to it for the Product, in accordance with the contract terms under which the Product is sold, Eaton shall have no obligation under this Warranty. Also during such time, the period of this Warranty shall continue to run and the expiration of this Warranty shall not be extended upon payment of any overdue or unpaid amounts.

COSTS NOT RELATED TO WARRANTY: The End-User shall be invoiced for, and shall pay for, all services not expressly provided for by the terms of this Warranty, including without limitation, site calls involving an inspection that determines no corrective maintenance is required. Any costs for replacement equipment, installation, materials, freight charges, travel expenses, or labor of Eaton representatives outside the terms of this Warranty will be borne by the End-User.

OBTAINING WARRANTY SERVICE: In the United States, call the Customer Reliability Center 7x24 at 800-356-5737. Outside of the United States, contact your local Eaton product sales or service representative. For comments or questions about this Warranty, write to the Customer Quality Representative, 3301 Spring Forest Road, Raleigh, North Carolina 27616 USA.